



STIC Search Report

Biotech-Chem Library

STIC Database Tracking Number: 210857

TO: Jennifer Cho
Location: rem/5C15/5C18
Art Unit: 1621
Wednesday, January 24, 2007
Case Serial Number: 10/040059

From: Les Henderson
Location: Biotech-Chem Library
REM-1B61
Phone: (571)272-2538
leslie.henderson@uspto.gov

Search Notes

Results can also be viewed via SCORE. <http://es/ScoreAccessWeb/>

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=> d que 1110

L2 QUE ABB=ON PLU=ON BOCIAN D?/AU
 L3 QUE ABB=ON PLU=ON KUHR W?/AU
 L4 QUE ABB=ON PLU=ON LINDSEY J?/AU
 L5 QUE ABB=ON PLU=ON DABKE R?/AU
 L7 QUE ABB=ON PLU=ON LIU ZHIMING?/AU
 L8 QUE ABB=ON PLU=ON (L2 OR L3 OR L4 OR L5) OR L7
 L50 171851 SEA FILE=HCAPLUS ABB=ON PLU=ON (SEMICONDUCT? OR
 SEMI(W) CONDUCT?) AND (SILICON? OR GROUP(W) (IV OR 4))
 L51 1 SEA FILE=REGISTRY ABB=ON PLU=ON SILICON/CN
 L52 1 SEA FILE=REGISTRY ABB=ON PLU=ON PORPHYRIN/CN
 L53 1 SEA FILE=REGISTRY ABB=ON PLU=ON PHTHALOCYANINE/CN
 L54 1 SEA FILE=REGISTRY ABB=ON PLU=ON CHLORIN/CN
 L55 1 SEA FILE=REGISTRY ABB=ON PLU=ON HEMIN/CN
 L56 QUE ABB=ON PLU=ON L51 OR SILICON OR SI
 L57 632 SEA FILE=HCAPLUS ABB=ON PLU=ON L52/D OR L52/DP
 L58 2851 SEA FILE=HCAPLUS ABB=ON PLU=ON L53/D OR L53/DP
 L59 119 SEA FILE=HCAPLUS ABB=ON PLU=ON L54/D OR L54/DP
 L60 220 SEA FILE=HCAPLUS ABB=ON PLU=ON L55/D OR L55/DP
 L61 82774 SEA FILE=HCAPLUS ABB=ON PLU=ON PORPHyrins+PFT, OLD, NT/
 CT
 L62 8102 SEA FILE=HCAPLUS ABB=ON PLU=ON PHTHALOCYANINE+PFT, OLD
 ,NT/CT
 L63 82774 SEA FILE=HCAPLUS ABB=ON PLU=ON L61 OR L62
 L64 458816 SEA FILE=HCAPLUS ABB=ON PLU=ON SILICON+PFT, OLD, NT/CT
 L65 QUE ABB=ON PLU=ON ?PORPHYRIN? OR ?PORPHIN? OR CHLOR
 IN OR HEMIN? OR ?PHTHALOCYAN?
 L66 QUE ABB=ON PLU=ON (DOPE# OR DOPING? OR DOPANT?) (L) ((
 N OR P) (L) TYPE)
 L67 QUE ABB=ON PLU=ON PASSIVATION+PFT, OLD, NT/CT
 L70 QUE ABB=ON PLU=ON SUBSTRAT? OR SURFACE? OR BASE# OR
 SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR FOUNDATION
 ? OR PANE? OR DISK? OR DISC# OR WAFER? OR PLATE OR PLAT
 ES
 L71 QUE ABB=ON PLU=ON OXYGEN OR O
 L72 QUE ABB=ON PLU=ON (HALOGENAT? OR IODIN? OR BROMIN? O
 R CHLORIN? OR FLUORIN?)
 L73 QUE ABB=ON PLU=ON (HYDROGEN OR H) (L) (PASSIVAT? OR L3
 73)
 L74 QUE ABB=ON PLU=ON L56 OR L64
 L75 5118 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L74 AND ((L57
 OR L58 OR L59 OR L60) OR L66 OR L63)
 L76 3618 SEA FILE=HCAPLUS ABB=ON PLU=ON L75 AND L70
 L77 421250 SEA FILE=HCAPLUS ABB=ON PLU=ON L74 (L) L70
 L78 2919 SEA FILE=HCAPLUS ABB=ON PLU=ON L76 AND L77
 L79 2882 SEA FILE=HCAPLUS ABB=ON PLU=ON L78 AND L66
 L80 QUE ABB=ON PLU=ON (L56(A)L71)(3A)BOND?
 L81 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L79 AND L80
 L82 94 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L74 AND ((L57
 OR L58 OR L59 OR L60) OR L63)
 L83 59 SEA FILE=HCAPLUS ABB=ON PLU=ON L82 AND L70
 L84 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L83 AND L66
 L88 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L76 AND L80
 L89 QUE ABB=ON PLU=ON (L56(A)L71)(L)BOND?
 L90 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L78 AND L89
 L93 QUE ABB=ON PLU=ON (L56(A)L71)(2A)BOND?
 L95 186319 SEA FILE=HCAPLUS ABB=ON PLU=ON (SEMICONDUCT? OR
 SEMI(W) CONDUCT?) AND L74
 L96 350 SEA FILE=HCAPLUS ABB=ON PLU=ON L95 AND ((L57 OR L58
 OR L59 OR L60 OR L61 OR L62 OR L63) OR L65)
 L97 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND L80
 L98 252 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND L70
 L99 187 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND L77
 L100 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L99 AND L66
 L101 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L98 AND L66

L102 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L99 AND L72
 L103 4 SEA FILE=HCAPLUS ABB=ON PLU=ON L99 AND L73
 L104 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND L93
 L106 20 SEA FILE=HCAPLUS ABB=ON PLU=ON L81 OR L84 OR L88 OR
 L90 OR L97 OR (L100 OR L101 OR L102 OR L103 OR L104)
 L107 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L99 AND (COAT? OR
 FILM?) AND (BASE OR BASIC)
 L108 31 SEA FILE=HCAPLUS ABB=ON PLU=ON L106 OR L107
 L109 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L8 AND L108
 L110 28 SEA FILE=HCAPLUS ABB=ON PLU=ON L108 NOT L109

=> d que 148

L2 QUE ABB=ON PLU=ON BOCIAN D?/AU
 L3 QUE ABB=ON PLU=ON KUHR W?/AU
 L4 QUE ABB=ON PLU=ON LINDSEY J?/AU
 L5 QUE ABB=ON PLU=ON DABKE R?/AU
 L7 QUE ABB=ON PLU=ON LIU ZHIMING?/AU
 L8 QUE ABB=ON PLU=ON (L2 OR L3 OR L4 OR L5) OR L7
 L12 689 SEA L8
 L18 667 SEA (SEMICONDUCT? OR SEMI(W) CONDUCT?) AND PORPHYRIN?
 L19 438489 SEA (SEMICONDUCT? OR SEMI(W) CONDUCT?) AND (SILICON?
 OR GROUP(W) (IV OR 4))
 L20 81 SEA L18 AND L19
 L21 16 SEA L20 AND (MONOLAYER? OR MONO(W) LAYER? OR SELF(N)
 ASSEMBL?)
 L22 61 SEA L20 AND (SUBSTRAT? OR SURFACE? OR BASE# OR
 SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR FOUNDATION
 ? OR PANE? OR DISK? OR DISC# OR WAFER? OR PLATE OR
 PLATES)
 L23 3 SEA L22 AND PASSIVAT?
 L24 5139 SEA (SEMICONDUCT? OR SEMI(W) CONDUCT?) AND (?PORPHYRIN?
 OR ?PORPHIN? OR CHLORIN OR HEMIN? OR ?PHTHALOCYAN?)
 L25 581 SEA L24 AND L19
 L26 455 SEA L25 AND (SUBSTRAT? OR SURFACE? OR BASE# OR
 SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR FOUNDATION
 ? OR PANE? OR DISK? OR DISC# OR WAFER? OR PLATE OR
 PLATES)
 L27 56 SEA L26 AND (MONOLAYER? OR MONO(W) LAYER? OR SELF(N)
 ASSEMBL?)
 L28 54 SEA L26 AND (HALOGENAT? OR IODIN? OR BROMIN? OR
 CHLORIN? OR FLUORIN?)
 L29 3 SEA L26 AND (DOPE# OR DOPING? OR DOPANT?) (6N) ((N OR
 P) (3N) TYPE)
 L30 62 SEA L26 AND (DOPE# OR DOPING? OR DOPANT?)
 L31 53 SEA L26 AND ((N OR P) (3N) TYPE)
 L32 14 SEA L30 AND L31
 L33 188 SEA (L27 OR L28 OR L29 OR L30 OR L31 OR L32)
 L34 189 SEA L33 OR L21 OR L23
 L35 49 SEA L34 AND (ALCOHOL? OR OH OR HYDROXY?)
 L36 2 SEA L35 AND (((SILICON OR SI) (N) (OXYGEN OR O)) (3N)
 BOND?)
 L37 3 SEA L26 AND (((SILICON OR SI) (N) (OXYGEN OR O)) (3N)
 BOND?)
 L39 9 SEA L23 OR L29 OR (L36 OR L37)
 L42 22 SEA L27 AND (L28 OR L30 OR L31 OR L35)
 L43 14 SEA L28 AND (L30 OR L31)
 L44 16 SEA L28 AND L35
 L45 35 SEA L39 OR L43 OR L44
 L46 52 SEA L45 OR L42
 L47 7 SEA L46 AND L12
 L48 45 SEA L46 NOT L47

=> dup rem 1110 148

FILE 'HCAPLUS' ENTERED AT 17:32:45 ON 22 JAN 2007

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10/0400059

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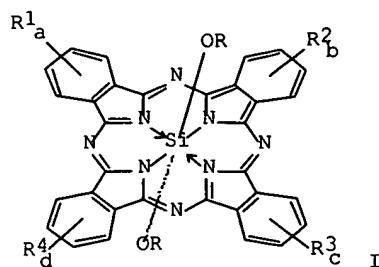
FILE 'WPIX' ENTERED AT 17:32:45 ON 22 JAN 2007
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PROCESSING COMPLETED FOR L110
PROCESSING COMPLETED FOR L48
L113 72 DUP REM L110 L48 (1 DUPLICATE REMOVED)
 ANSWERS '1-28' FROM FILE HCPLUS
 ANSWER '29' FROM FILE COMPENDEX
 ANSWERS '30-33' FROM FILE INSPEC
 ANSWER '34' FROM FILE DISSABS
 ANSWERS '35-72' FROM FILE WPIX

=> d 1113 1-28 ibib abs ed hitstr hitind

L113 ANSWER 1 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 1
ACCESSION NUMBER: 1988:446308 HCPLUS Full-text
DOCUMENT NUMBER: 109:46308
TITLE: Optical recording media composed of
 silicon phthalocyanine
INVENTOR(S): Morikawa, Kenji; Shibano, Hiroshi; Yamazaki,
 Harumasa
PATENT ASSIGNEE(S): Kao Corp., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------------------|------|----------|-----------------|--------------|
| ----- | ---- | ----- | ----- | ----- |
| JP 62233288 | A | 19871013 | JP 1986-75981 | 1986 0402 |
| PRIORITY APPLN. INFO.: | | | JP 1986-75981 | 1986 0402 |

GI



AB The recording layer of the title optical recording medium contains **Si phthalocyanine I** [$R = C1-20$ alkyl, alkenyl, aromatic hydrocarbon group, acyl, trisubstituted silyl; **Si-O bonds** extend in the direction opposite to each other; $R1-R4 = H$, halo, $C1-20$ (un)substituted alkyl, alkenyl; $a, b, c, d = 1-4$]. The media have a high sensitivity to **semiconductor** or He-Ne laser light and long shelf life even at high temperature and high humidity.

ED Entered STN: 05 Aug 1988

IC ICM B41M005-26

ICS G11B007-24

CC 74-12 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST optical recording medium **silicon phthalocyanine**

IT Recording materials

(optical, containing **silicon phthalocyanine**, sensitive to near-IR light)

L113 ANSWER 2 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2006:29273 HCPLUS Full-text

DOCUMENT NUMBER: 144:131801

TITLE: Solar cell using passivated, dye-sensitized oxide **semiconductor** electrode

INVENTOR(S): Spivack, James Lawrence; Gasaway, Shellie Virginia; Siclovan, Oltea Puica

PATENT ASSIGNEE(S): General Electric Company, USA

SOURCE: U.S. Pat. Appl. Publ., 10 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------------------|------|----------|----------------------|-------------------|
| US 2006005877 | A1 | 20060112 | US 2004-884028 | 2004 0706 |
| JP 2006024565 | A | 20060126 | JP 2005-195937 | 2005 0705 |
| DE 102005031680 | A1 | 20060216 | DE 2005-102005031680 | 2005 0705 |
| CN 1719618 | A | 20060111 | CN 2005-10082507 | 2005 0706 |
| PRIORITY APPLN. INFO.: | | | US 2004-884028 | A 2004 0706 |

AB Disclosed is a dye-sensitized oxide **semiconductor** electrode comprising an elec. conductive substrate, an oxide **semiconductor** film provided on a surface of the elec.

conductive substrate, and a sensitizing dye adsorbed on the film, wherein the oxide semiconductor film has been further treated with at least one silanizing agent comprising the partial structure R1--Si--OR₂, wherein R₁ and R₂ are each independently alkyl groups, or R₁ is an alkyl group and R₂ is hydrogen or aryl. Also disclosed are solar cells comprising the electrode and a method for improving the efficiency of the solar cells. The solar cells exhibit improved efficiency and other beneficial properties compared to similar cells not having the passivated electrode.

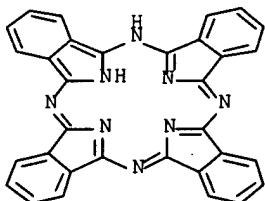
ED Entered STN: 12 Jan 2006

IT 574-93-6, Phthalocyanine

RL: MOA (Modifier or additive use); USES (Uses)
(dye; solar cell using passivated, dye-sensitized oxide semiconductor electrode)

RN 574-93-6 HCAPLUS

CN 29H,31H-Phthalocyanine (9CI) (CA INDEX NAME)



INCL 136263000; 136252000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST solar cell passivated dye sensitized oxide semiconductor
electrode; photoelectrochem cell passivated dye sensitized oxide
semiconductor electrode

IT Silanes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical
process); PROC (Process)
(alkyl; solar cell using passivated, dye-sensitized oxide
semiconductor electrode)

IT Oxides (inorganic), uses

RL: TEM (Technical or engineered material use); USES (Uses)
(coating; solar cell using passivated, dye-sensitized oxide
semiconductor electrode)

IT Porphyrins

RL: MOA (Modifier or additive use); USES (Uses)
(dye; solar cell using passivated, dye-sensitized oxide
semiconductor electrode)

IT Coumarins

RL: MOA (Modifier or additive use); USES (Uses)
(dyes; solar cell using passivated, dye-sensitized oxide
semiconductor electrode)

IT Silylation

(semiconductor film; solar cell using passivated,
dye-sensitized oxide semiconductor electrode)

IT Semiconductor films

(silanizing agent-treated; solar cell using passivated,
dye-sensitized oxide semiconductor electrode)

IT Conducting polymers

Cyanine dyes

Electric conductors, ceramic

Electric contacts

Perovskite-type crystals

Photoelectrochemical cells

Photoelectrodes

Silylation

Solar cells

(solar cell using passivated, dye-sensitized oxide
semiconductor electrode)

IT Plate glass
 RL: TEM (Technical or engineered material use); USES (Uses)
 (solar cell using passivated, dye-sensitized oxide
 semiconductor electrode)

IT 502693-09-6, Ruthenium 520DN
 RL: MOA (Modifier or additive use); USES (Uses)
 (Ruthenium 520DN; solar cell using passivated, dye-sensitized
 oxide semiconductor electrode)

IT 198-55-0, Perylene 574-93-6, Phthalocyanine
 78675-98-6, Squaraine
 RL: MOA (Modifier or additive use); USES (Uses)
 (dye; solar cell using passivated, dye-sensitized oxide
 semiconductor electrode)

IT 3069-19-0, n-Hexyltrimethoxysilane 3069-21-4,
 Dodecyltrimethoxysilane 3069-40-7, n-Octyltrimethoxysilane
 3069-42-9, Octadecyltrimethoxysilane 16415-12-6,
 Hexadecyltrimethoxysilane 34396-03-7, 2,4,4-
 Trimethylpentyltrimethoxysilane 52217-60-4, 1,8-
 Bis(trimethoxysilyl)octane 85857-16-5, 2-
 (Perfluorohexylethyl)trimethoxysilane 88468-45-5,
 IsoOctyltrimethoxysilane 122185-09-5, 1,10-
 Bis(trimethoxysilyl)decane 131271-22-2 131271-24-4
 131271-26-6
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical
 process); PROC (Process)
 (solar cell using passivated, dye-sensitized oxide
 semiconductor electrode)

IT 75-05-8, Acetonitrile, uses 631-40-3, Tetrapropylammonium iodide
 1312-81-8, Lanthanum oxide 1314-11-0, Strontium oxide, uses
 1314-13-2, Zinc oxide, uses 1314-23-4, Zirconium oxide, uses
 1314-35-8, Tungsten oxide, uses 1314-36-9, Yttrium oxide, uses
 1332-29-2, Tin oxide 1632-83-3, N-Methylbenzimidazole
 3978-81-2, 4-tert-Butylpyridine 7553-56-2, Iodine,
 uses 10377-51-2, Lithium iodide 11098-99-0, Molybdenum oxide
 11099-11-9, Vanadium oxide 11118-57-3, Chromium oxide
 12049-50-2, Calcium titanium oxide (CaTiO₃) 12055-23-1, Hafnium
 oxide 12060-59-2, Strontium titanium oxide (SrTiO₃)
 12627-00-8, Niobium oxide 13463-67-7, Titanium oxide, uses
 59763-75-6, Tantalum oxide 119171-18-5, 1-Methyl-3-propyl-
 imidazolium iodide 216299-72-8
 RL: DEV (Device component use); USES (Uses)
 (solar cell using passivated, dye-sensitized oxide
 semiconductor electrode)

IT 7440-04-2D, Osmium, complex 7440-18-8D, Ruthenium, complex
 141460-19-7, Ruthenium 535
 RL: MOA (Modifier or additive use); USES (Uses)
 (solar cell using passivated, dye-sensitized oxide
 semiconductor electrode)

IT 1312-43-2, India 1344-28-1, Alumina, uses 7631-86-9, Silica,
 uses 18282-10-5, Tin dioxide
 RL: TEM (Technical or engineered material use); USES (Uses)
 (solar cell using passivated, dye-sensitized oxide
 semiconductor electrode)

L113 ANSWER 3 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2006:79112 HCPLUS Full-text
 DOCUMENT NUMBER: 144:153451
 TITLE: Functionalized nanowire-conducting polymer-
 based photoactive nanocomposites for
 photovoltaic cells and solar cells
 INVENTOR(S): Firon, Muriel; Drevillon, Bernard;
 Fonctcuberta, I. Morral Anna; Palacin, Serge;
 Roca, I. Cabaroccas Pere
 PATENT ASSIGNEE(S): Commissariat A L'Energie Atomique, Fr.
 SOURCE: Fr. Demande, 18 pp.
 CODEN: FRXXBL
 DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---------------|------|----------|-----------------|--------------|
| FR 2873492 | A1 | 20060127 | FR 2004-51607 | |
| | | | | 2004 0721 |
| FR 2873492 | B1 | 20061124 | | |
| WO 2006018575 | A1 | 20060223 | WO 2005-FR50605 | |
| | | | | 2005 0721 |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,
 CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG,
 ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,
 KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,
 MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG,
 PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ,
 TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
 RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR,
 HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI,
 SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
 NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL,
 SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

PRIORITY APPLN. INFO.: FR 2004-51607 A
 2004
 0721

AB Photoactive nanocomposites, especially for a photovoltaic cell, consist of an assembly containing a donor-acceptor **semiconductor** element consisting of a **sp₃-type** nanowire (e.g., functionalized **silicon** or **germanium**) composited with an organic compound (preferably a conjugated polymer or a electron-rich organic compound), which is deposited on a **substrate** (preferably ITO). The nanowire (with diameter <100 nm, preferably <10 nm) can be **n-doped** or **p-doped**, and is preferably **surface-functionalized**. Suitable organic compds. include conducting polymers (e.g., polyaniline, poly-**p**-phenylene, poly-**p**-phenylenesulfide, etc.), **phthalocyanines**, **porphyrins**, chlorophyll, pentacene, tetracene, quinacridone, etc.

ED Entered STN: 27 Jan 2006

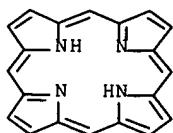
IT 101-60-0, **Porphyrin** 574-93-6,

Phthalocyanine

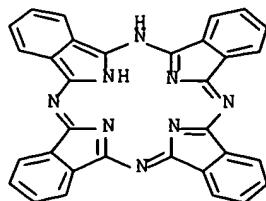
RL: DEV (Device component use); USES (Uses)
 (nanocomposites; nanowire-conducting polymer-based
 photoactive nanocomposites for photovoltaic cells and solar
 cells)

RN 101-60-0 HCPLUS

CN 21H,23H-Porphine (9CI) (CA INDEX NAME)



RN 574-93-6 HCPLUS
 CN 29H,31H-Phthalocyanine (9CI) (CA INDEX NAME)



IT 7440-21-3, Silicon, uses
 RL: DEV (Device component use); USES (Uses)
 (nanowires, surface-functionalized;
 nanowire-conducting polymer-based photoactive
 nanocomposites for photovoltaic cells and solar cells)
 RN 7440-21-3 HCPLUS
 CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
 Section cross-reference(s): 38, 76
 ST photoactive nanowire nanocomposite photovoltaic cell; donor
 acceptor **semiconductor** nanocomposite solar cell;
silicon germanium nanowire composite photovoltaic cell
 IT Polymers, uses
 RL: DEV (Device component use); USES (Uses)
 (conjugated, nanocomposites; nanowire-conducting polymer-
 based photoactive nanocomposites for photovoltaic cells
 and solar cells)
 IT **Semiconductor** materials
 (n-type, nanocomposites; nanowire-conducting polymer-
 based photoactive nanocomposites for photovoltaic cells
 and solar cells)
 IT Conducting polymers
 Cyanine dyes
Semiconductor materials
 (nanocomposites; nanowire-conducting polymer-based
 photoactive nanocomposites for photovoltaic cells and solar
 cells)
 IT **Chlorophylls**, uses
 Poly(arylenealkenylenes)
 Polyacetylenes, uses
 Polyanilines
 Polyphenyls
 Polythiophenylenes
Porphyrins
 RL: DEV (Device component use); USES (Uses)
 (nanocomposites; nanowire-conducting polymer-based
 photoactive nanocomposites for photovoltaic cells and solar
 cells)
 IT Photoelectric devices
 Solar cells
 (nanowire-conducting polymer-based photoactive
 nanocomposites for photovoltaic cells and solar cells)
 IT Charge transfer complexes
 RL: DEV (Device component use); USES (Uses)
 (nanowire-conducting polymer-based photoactive
 nanocomposites for photovoltaic cells and solar cells)
 IT Nanocomposites
 (nanowires-conducting polymers; nanowire-conducting polymer-

based photoactive nanocomposites for photovoltaic cells
 and solar cells)
 IT Semiconductor materials
 (p-type, nanocomposites; nanowire-conducting polymer-
 based photoactive nanocomposites for photovoltaic cells
 and solar cells)
 IT Conducting polymers
 (polyfluorenes, nanocomposites; nanowire-conducting polymer-
 based photoactive nanocomposites for photovoltaic cells
 and solar cells)
 IT Conducting polymers
 (polypyrroles, nanocomposites; nanowire-conducting polymer-
 based photoactive nanocomposites for photovoltaic cells
 and solar cells)
 IT Conducting polymers
 (polythiophenes, nanocomposites; nanowire-conducting polymer-
 based photoactive nanocomposites for photovoltaic cells
 and solar cells)
 IT Nanowires
 (surface-functionalized; nanowire-conducting polymer-
 based photoactive nanocomposites for photovoltaic cells
 and solar cells)
 IT 92-24-0, Tetracene 101-60-0, **Porphyrin**
 135-48-8, Pentacene 479-61-8 574-93-6,
Phthalocyanine 1047-16-1, Quinacridone 1047-16-1D,
 Quinacridone, derivs. 23627-89-6, **Naphthalocyanine**
 23627-89-6D, **Naphthalocyanine**, derivs. 25067-58-7,
 Polyacetylene 25067-58-7D, Polyacetylene, derivs. 25190-62-9,
 Poly-p-phenylene 25190-62-9D, Poly-p-phenylene, derivs.
 25212-74-2, Poly(p-phenylenesulfide) 25212-74-2D,
 Poly(p-phenylenesulfide), derivs. 25233-30-1, Polyaniline
 25233-34-5, Polythiophene 25233-34-5D, Polythiophene, derivs.
 26009-24-5, Poly(1,4-phenylene-1,2-ethenediyl) 26009-24-5D,
 Poly(1,4-phenylene-1,2-ethenediyl), derivs. 30604-81-0,
 Polypyrrole 30604-81-0D, Polypyrrole, derivs. 66280-99-7
 104934-50-1, Poly(3-hexylthiophene) 116803-36-2 126213-51-2,
 PEDOT 500149-96-2 500149-96-2D, derivs. 874117-02-9
 RL: DEV (Device component use); USES (Uses)
 (nanocomposites; nanowire-conducting polymer-based
 photoactive nanocomposites for photovoltaic cells and solar
 cells)
 IT 7440-21-3, **Silicon**, uses 7440-56-4, Germanium,
 uses
 RL: DEV (Device component use); USES (Uses)
 (nanowires, surface-functionalized;
 nanowire-conducting polymer-based photoactive
 nanocomposites for photovoltaic cells and solar cells)
 IT 95270-88-5
 RL: DEV (Device component use); USES (Uses)
 (polyfluorenes, nanocomposites; nanowire-conducting polymer-
 based photoactive nanocomposites for photovoltaic cells
 and solar cells)
 IT 50926-11-9, Indium tin oxide
 RL: NUU (Other use, unclassified); USES (Uses)
 (substrate; nanowire-conducting polymer-based
 photoactive nanocomposites for photovoltaic cells and solar
 cells)
 REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L113 ANSWER 4 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2006:1141671 HCPLUS Full-text
 DOCUMENT NUMBER: 145:498522
 TITLE: Method for fabricating metal-base
 organic transistor
 INVENTOR(S): Ma, Dongge; Yi, Mingdong; Yu, Shunyang; You,

PATENT ASSIGNEE(S): Han; Feng, Chengang
 Changchun Institute of Applied Chemistry,
 Chinese Academy of Sciences, Peop. Rep. China
 SOURCE: Faming Zhanli Shengqing Gongkai Shuomingshu,
 26pp.
 DOCUMENT TYPE: Patent
 LANGUAGE: Chinese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------------------|------|----------|------------------|--------------|
| CN 1851954 | A | 20061025 | CN 2006-10016875 | 2006 0525 |
| PRIORITY APPLN. INFO.: | | | CN 2006-10016875 | 2006 0525 |

AB The title method comprises directly evaporating, using a vertical structure, a metal **base**, an organic emitter and an emitter metal onto an **n-** or **p-type** highly- **doped** silicon **substrate** to obtain a metal-**base** organic transistor with a configuration of metal contact electrode/highly-doped silicon substrate/metal **base**/organic emitter/emitter contact metal electrode/metal **base**. The obtained metal- **base** organic transistor driven by d.c. has a common- **base** gain of approx. to 1 and a maximum common-emitter gain of 8,500.
 ED Entered STN: 01 Nov 2006
 IT 7440-21-3, Silicon, uses
 RL: DEV (Device component use); USES (Uses)
 (method for fabricating metal-**base** organic transistor)
 RN 7440-21-3 HCAPLUS
 CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 76-3 (Electric Phenomena)
 IT Photolithography
 Semiconductor device fabrication
 Transistors
 (method for fabricating metal-**base** organic transistor)
 IT Coating process
 (spin; method for fabricating metal-**base** organic transistor)
 IT Vapor deposition process
 (vacuum; method for fabricating metal-**base** organic transistor)
 IT 147-14-8, Copper phthalocyanine 1314-62-1, Vanadium pentoxide, uses 2085-33-8 7429-90-5, Aluminum, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7789-24-4, Lithium fluoride, uses 9011-14-7, Polymethylmethacrylate 14916-87-1 65181-78-4, N,N'-Diphenyl-N,N'-bis(3-methyl-phenyl)-1,1'-biphenyl-4,4'-diamine
 RL: DEV (Device component use); USES (Uses)
 (method for fabricating metal-**base** organic transistor)
 IT 7664-39-3, Hydrofluoric acid, uses 7727-37-9, Nitrogen, uses
 RL: NUU (Other use, unclassified); USES (Uses)
 (method for fabricating metal-**base** organic transistor)

L113 ANSWER 5 OF 72 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2006:533561 HCAPLUS Full-text
 DOCUMENT NUMBER: 145:196162
 TITLE: Oxygen effects on the interfacial electronic
 structure of titanyl **phthalocyanine**
p-Type
doping, band bending and Fermi level
 alignment
 AUTHOR(S): Nishi, Toshio; Kanai, Kaname; Ouchi, Yukio;
 Willis, Martin R.; Seki, Kazuhiko
 CORPORATE SOURCE: Department of Chemistry, Graduate School of
 Science, Nagoya University, Nagoya, 464-8602,
 Japan
 SOURCE: Chemical Physics (2006), 325(1), 121-128
 CODEN: CMPHC2; ISSN: 0301-0104
 PUBLISHER: Elsevier B.V.
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB The effect of oxygen **doping** on titanyl **phthalocyanine** (TiOPc) film was investigated by UPS. The electronic structure of the interface formed between TiOPc films deposited on highly oriented pyrolytic graphite (HOPG) was clearly different between the films prepared in ultrahigh vacuum (UHV) and under O₂ atmosphere (1.3 + 10⁻² Pa). The film deposited in UHV showed downward band bending characteristic of **n-type semiconductor**, possibly due to residual impurities working as unintentional **n-type dopants**. On the other hand, the film deposited under O₂ atmosphere showed upward band bending characteristic of **p-type semiconductor**. Such trends, including the conversion from **n**- to **p-type**, are in excellent correspondence with reported field effect transistor characteristics of TiOPc, and clearly demonstrates that bulk TiOPc film was **p-doped** with oxygen. In order to examine the Fermi level alignment between TiOPc film and the **substrate**, the energy of the HOMO of TiOPc relative to the Fermi level of the conductive **substrate** was determined for various **substrates**. The alignment between the Fermi level of conductive **substrate** and Fermi level of TiOPc film at fixed energy in the band gap was not observed for the TiOPc film prepared in UHV, possibly because of insufficient charge *d.* in the TiOPc film. This situation was drastically changed when the TiOPc film were exposed to O₂, and clear alignment of the Fermi level fixed at 0.6 eV above the HOMO with the Fermi level of the conducting **substrate** was observed, probably by **p-type doping** effect of oxygen. These are the first direct and quant. information about bulk oxygen **doping** from the viewpoint of the electronic structure. These results suggest that a similar band bending with Fermi level alignment may be also achieved for other organic **semiconductors** under practical device conditions, and also call for caution at the comparison of exptl. results obtained under UHV and ambient atmospheric

ED Entered STN: 07 Jun 2006
 IT 7440-21-3, **Silicon**, processes
 RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
 (**substrate**; oxygen effects on interfacial electronic structure of titanyl **phthalocyanine** film and band bending and Fermi level alignment)
 RN 7440-21-3 HCAPLUS
 CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 65-3 (General Physical Chemistry)
 Section cross-reference(s): 73
 ST titanyl **phthalocyanine** oxygen doping band bending Fermi level HOMO
 IT Band bending
 Band structure
 Doping
 Fermi level

HOMO (molecular orbital)
 Solid-solid interface
 UV photoelectron spectra
 Vapor deposition process
 (oxygen effects on interfacial electronic structure of titanyl phthalocyanine film and band bending and Fermi level alignment)

IT 7782-44-7, Oxygen, uses
 RL: MOA (Modifier or additive use); USES (Uses)
 (dopant; oxygen effects on interfacial electronic structure of titanyl phthalocyanine film and band bending and Fermi level alignment)

IT 26201-32-1, Titanyl phthalocyanine
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
 (oxygen effects on interfacial electronic structure of titanyl phthalocyanine film and band bending and Fermi level alignment)

IT 7439-95-4, Magnesium, processes 7440-21-3,
 Silicon, processes 7440-22-4, Silver, processes
 7440-50-8, Copper, processes 7440-57-5, Gold, processes
 7631-86-9, Silica, processes 7782-42-5, Graphite, processes
 RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
 (substrate; oxygen effects on interfacial electronic structure of titanyl phthalocyanine film and band bending and Fermi level alignment)

REFERENCE COUNT: 40 THERE ARE 40 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L113 ANSWER 6 OF 72 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2005:229113 HCAPLUS Full-text
 DOCUMENT NUMBER: 142:458884
 TITLE: Uniform Approach to Bacteriochlorophyll-Based Monolayers on Conducting, Semiconducting, and Insulating Substrates
 AUTHOR(S): Filip-Granit, Neta; Yerushalmi, Roie; Brandis, Alexander; Van der Boom, Milko E.; Scherz, Avigdor
 CORPORATE SOURCE: Department of Plant Science, Department of Organic Chemistry, Weizmann Institute of Science, Rehovot, 76100, Israel
 SOURCE: Journal of Physical Chemistry B (2005), 109(15), 6933-6935
 CODEN: JPCBFK; ISSN: 1520-6106
 PUBLISHER: American Chemical Society
 DOCUMENT TYPE: Journal
 LANGUAGE: English
 AB A general approach is demonstrated for the formation of monolayers comprised of free-base and metalated Bacteriochlorophyll-based derivs. providing a new vehicle for studying photosynthetic motifs and chromophore thin-film interactions. Accessibility to covalent and self-assembled systems on conducting, semiconducting, and insulating substrates is realized utilizing identical mol. building blocks. The monolayers retain the optical features typical for the new systems in solution. Mol. organization of chromophore interaction motifs can be sequentially designed using preassembled building blocks in solution and expressed in the thin film optical properties. For instance, intramol. π-π stacking is conserved for the dimeric Ni-based chromophores as deduced from the spectroscopic measurements of the monolayers and in solution
 ED Entered STN: 17 Mar 2005
 IT 7440-21-3, Silicon, biological studies
 RL: BUU (Biological use, unclassified); BIOL (Biological study); USES (Uses)
 (substrate for Bacteriochlorophyll-derivative monolayer assembly; assembly of Bacteriochlorophyll-based

10/0400059

monolayers on conducting, **semiconducting**, and
insulating **substrates**)
RN 7440-21-3 HCAPLUS
CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 6-7 (General Biochemistry)
Section cross-reference(s): 9
ST Bacteriochlorophyll monolayer assembly **semiconducting**
insulating
IT Self-assembled monolayers
Ultrathin films
(uniform approach to Bacteriochlorophyll-based monolayers on
conducting, **semiconducting**, and insulating
substrates)
IT **Bacteriochlorophylls**
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(uniform approach to Bacteriochlorophyll-based monolayers on
conducting, **semiconducting**, and insulating
substrates)
IT 371921-71-0, Dichloroiodo(4-iodomethyl)phenylsilane
RL: BUU (Biological use, unclassified); BIOL (Biological study);
USES (Uses)
(coupling layer for Bacteriochlorophyll-derivative monolayer
assembly; assembly of Bacteriochlorophyll-based monolayers on
conducting, **semiconducting**, and insulating
substrates)
IT 7440-57-5, Gold, biological studies
RL: BUU (Biological use, unclassified); BIOL (Biological study);
USES (Uses)
(film, substrate for Bacteriochlorophyll-derivative
monolayer; assembly of Bacteriochlorophyll-based monolayers on
conducting, **semiconducting**, and insulating
substrates)
IT 7440-21-3, Silicon, biological studies
50926-11-9, Indium tin oxide 60676-86-0, Silica glass
RL: BUU (Biological use, unclassified); BIOL (Biological study);
USES (Uses)
(substrate for Bacteriochlorophyll-derivative monolayer
assembly; assembly of Bacteriochlorophyll-based
monolayers on conducting, **semiconducting**, and
insulating **substrates**)
IT 851532-73-5P 851537-03-6P 851537-05-8P 851537-07-0P
RL: BSU (Biological study, unclassified); PRP (Properties); RCT
(Reactant); SPN (Synthetic preparation); BIOL (Biological study);
PREP (Preparation); RACT (Reactant or reagent)
(synthesis of functionalized free **base**, metal, and
dimeric Bacteriochlorophyll-derivs.)
IT 60-23-1, 2-Aminoethanethiol 7440-02-0, Nickel, reactions
171598-60-0 343341-41-3
RL: RCT (Reactant); RACT (Reactant or reagent)
(synthesis of functionalized free **base**, metal, and
dimeric Bacteriochlorophyll-derivs.)
REFERENCE COUNT: 27 THERE ARE 27 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L113 ANSWER 7 OF 72 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2004:337387 HCAPLUS Full-text
DOCUMENT NUMBER: 141:323353
TITLE: Charge transport in pentacene and

AUTHOR(S): Berliocchi, M.; Manenti, M.; Bolognesi, A.; Di Carlo, A.; Lugli, P.; Paolesse, R.; Mandoy, F.; Di Natale, C.; Proietti, E.; Petrocco, G.; D'Amico, A.

CORPORATE SOURCE: Dipartimento di Ingegneria Elettronica, Universita di Roma "Tor Vergata", Rome, Italy

SOURCE: Semiconductor Science and Technology (2004), 19(4), S354-S356

CODEN: SSTEET; ISSN: 0268-1242

PUBLISHER: Institute of Physics Publishing

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Transport properties of a field effect transistor based on pentacene have been investigated by exptl. and numerical anal. Moreover, thin **film** transistors based on **porphyrin** have been realized and characterized. In order to derive from **basic** principles the transport properties of the organic **semiconductors**, we used a Monte Carlo (MC) simulator to calculate the field-dependent mobility. The overall device simulation is performed by using two-dimensional drift-diffusion simulations taking into account field-dependent mobility obtained from MC simulations, interface/bulk trap states and fixed charge d. at the organic/oxide interface. We demonstrate how carrier mobility can be extracted from exptl. device characteristics, without using the conventional MOSFET theory that could lead to wrong results. Finally, we demonstrate the realization of simple organic logic circuitry, namely an organic inverter with a different configuration of load transistor.

ED Entered STN: 26 Apr 2004

IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); USES (Uses)
(substrate; charge transport in pentacene and
porphyrin-based organic thin **film**
transistors)

RN 7440-21-3 HCAPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 76-3 (Electric Phenomena)

ST pentacene **porphyrin** thin **film** transistor logic circuit

IT Electric current-potential relationship
Interface traps
Logic circuits
Surface electric charge
Thin **film** transistors
Trapping
(charge transport in pentacene and **porphyrin-based** organic thin **film** transistors)

IT Electric current carriers
(mobility; charge transport in pentacene and **porphyrin**-based organic thin **film** transistors)

IT 135-48-8, Pentacene 1257-25-6, Octamethylporphyrin
RL: DEV (Device component use); USES (Uses)
(charge transport in pentacene and **porphyrin-based** organic thin **film** transistors)

IT 7440-47-3, Chromium, uses 7440-57-5, Gold, uses
RL: DEV (Device component use); USES (Uses)
(contacts; charge transport in pentacene and **porphyrin**-based organic thin **film** transistors)

IT 7631-86-9, Silica, uses
RL: DEV (Device component use); USES (Uses)
(**film**; charge transport in pentacene and

10/0400059

porphyrin-based organic thin film transistors)
IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); USES (Uses)
(substrate; charge transport in pentacene and
porphyrin-based organic thin film
transistors)

REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L113 ANSWER 8 OF 72 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2005:648615 HCAPLUS Full-text
DOCUMENT NUMBER: 143:158652
TITLE: Preparation of a magnetic composite
photocatalyst and its use for water
purification
INVENTOR(S): Li, Xinjun; Li, Fangbai; Wang, Liangyan; Xu,
Yuehua; Zhang, Qi
PATENT ASSIGNEE(S): Guangzhou Institute of Energy Conversion,
Chinese Academy of Sciences, Peop. Rep. China
SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 9
pp.
CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------------------|------|----------|-----------------|--------------|
| ----- | ---- | ----- | ----- | ----- |
| CN 1416956 | A | 20030514 | CN 2001-129844 | 2001 1101 |
| PRIORITY APPLN. INFO.: | | | CN 2001-129844 | 2001 1101 |

AB A photocatalyst is prepared having a magnetic support, an inert nano oxide film, and semiconducting granules with high catalytic activity. The magnetic support comprises Fe₃O₄ nano granules, and Ni phthalocyanine and Fe₃O₄ nano granules. The ratio of semiconducting granule and inorg. oxide film to magnetic support is 0.3:1-3:1 and 1:1-3:1, resp. The inert oxide film is prepared from nano SiO₂ or ZrO₂; and the semiconducting granule is TiO₂. The preparation process includes (1) dissolving Fe²⁺ and Fe³⁺ salt at the molar ratio of 1:0.5-1.5 with water, adding an inorg. base to generate a black precipitate, adjusting the pH to 10-12, keeping for 30 min, filtering, washing to pH = 7, adding to ethanol, adding a diamide solution with Ni phthalocyanine, stirring for 30 min, vaporizing at 40-90° under stirring to obtain the magnetic support; (2) mixing 2 M ortho-silicate solution, HCl and anhydrous ethanol at a molar ratio of 4:1:10 to form a Si-sol, adding to the magnetic support suspending solution at a Fe₃O₄/SiO₂ molar ratio of 1:0-1:5, stirring for 60 min, keeping for 1 d to obtain a SiO₂-coated magnetic support suspended solution; and (3) preparing Ti-sol by using B₄Titanate as material, anhydrous ethanol as an organic dispersing agent and acetic acid as catalyst, adding a Ti-sol to the SiO₂-coated magnetic support suspended solution at a Fe₃O₄/TiO₂ molar ratio 5:1-1:5, keeping for 2 d, drying at 80° for 2 d to obtain a powder, milling, and calcining at 400° in the presence of N₂. The Fe²⁺ and Fe³⁺ salt may be FeSO₄·7H₂O, and FeCl₃·6H₂O; and the inorg. base may be 3-9 M NaOH solution. The photocatalyst can be used for treatment of surface and ground water polluted by organic substance.

ED Entered STN: 26 Jul 2005

IC ICM B01J037-02

CC 61-5 (Water)

Section cross-reference(s): 67, 74

IT 7631-86-9, Silica, uses 13463-67-7, Titania, uses 14055-02-8,
Nickel phthalocyanine

RL: CAT (Catalyst use); USES (Uses)

(preparation of magnetic photocatalyst and its use for water

purification)

L113 ANSWER 9 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2003:370017 HCPLUS Full-text
 DOCUMENT NUMBER: 139:109384
 TITLE: Contact resistance in organic transistors that
 use source and drain electrodes formed by soft
 contact lamination
 AUTHOR(S): Zaumseil, Jana; Baldwin, Kirk W.; Rogers, John
 A.
 CORPORATE SOURCE: Lucent Technologies, Bell Laboratories, Murray
 Hill, NJ, 07974, USA
 SOURCE: Journal of Applied Physics (2003), 93(10, Pt.
 1), 6117-6124
 CODEN: JAPIAU; ISSN: 0021-8979
 PUBLISHER: American Institute of Physics
 DOCUMENT TYPE: Journal
 LANGUAGE: English
 AB Soft contact lamination of source/drain electrodes supported by gold-coated high-resolution rubber stamps against organic **semiconductor** films can yield high-performance organic transistors. This article presents a detailed study of the elec. properties of these devices, with an emphasis on the nature of the laminated contacts with the p- and n-type **semiconductors** pentacene and copper **hexadecafluorophthalocyanine**, resp. The anal. uses models developed for characterizing amorphous **silicon** transistors. The parasitic resistances related to the laminated contacts and their coupling to the transistor channel are considerably lower than those associated with conventional contacts formed by evaporation of gold electrodes directly on top of the organic **semiconductors**. These and other attractive features of transistors built by soft contact lamination suggest that they may be important for **basic** and applied studies in plastic electronics and nanoelectronic systems **based** on unconventional materials.

ED Entered STN: 15 May 2003

CC 76-3 (Electric Phenomena)

IT Contact resistance

Drain current

Electric contacts

Electric current-potential relationship

Electric resistance

Gate potential

Lamination

Sheet resistance

Thin film transistors

Transistors

 (contact resistance in organic transistors with source and drain
 electrodes formed by soft contact lamination)IT **Semiconductor** materials (organic; contact resistance in organic transistors with source and
 drain electrodes formed by soft contact lamination)REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L113 ANSWER 10 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2003:519199 HCPLUS Full-text

DOCUMENT NUMBER: 139:269761

TITLE: Cobalt oxide **based** gas sensors on
 silicon substrate for
 operation at low temperaturesAUTHOR(S): Wollenstein, J.; Burgmair, M.; Plescher, G.;
 Sulima, T.; Hildenbrand, J.; Bottner, H.;
 Eisele, I.CORPORATE SOURCE: Department of Microsensors, Fraunhofer
 Institute of Physical Measurement Techniques,
 Freiburg, D-79110, GermanySOURCE: Sensors and Actuators, B: Chemical (2003),
 B93(1-3), 442-448PUBLISHER: CODEN: SABCEB; ISSN: 0925-4005
 Elsevier Science B.V.

DOCUMENT TYPE: Journal
 LANGUAGE: English

AB The gas sensing characteristics and the morphol. of cobalt oxide thin films were studied. The thin films were prepared by reactive electron beam evaporation of cobalt on pure and **surface -oxidized silicon wafers** resp. followed by an addnl. thermal treatment. Structural and morphol. analyses of the thin Co₃O₄ films were performed by x-ray diffraction anal. (XRD), scanning electron microscope (SEM) and Rutherford backscattering (RBS). Two gas-sensitive parameters of the Co₃O₄ films were studied: the shift of the work function and change of conductivity during gas exposure. The gas measurements were carried out with ammonia, methane, carbon monoxide, hydrogen, chlorine (only GasFET) and nitric dioxide as test gases in synthetic air at different humidities. The work function measurements were carried out with suspended gate GasFETs as transducer, the resistive measurements with single chip thin-film sensor arrays.

ED Entered STN: 08 Jul 2003

IT 7440-21-3, Silicon, analysis

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
 (evaluation of cobalt oxide **based** gas sensors on **silicon substrate** for operation at low temps.)

RN 7440-21-3 HCAPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 79-2 (Inorganic Analytical Chemistry)

Section cross-reference(s): 59, 76

ST cobalt oxide gas sensor **silicon substrate**

IT Air analysis

Field effect transistors

Semiconductor device fabrication

Semiconductor gas sensors

(evaluation of cobalt oxide **based** gas sensors on **silicon substrate** for operation at low temps.)

IT 74-82-8, Methane, analysis 630-08-0, Carbon monoxide, analysis

1333-74-0, Hydrogen, analysis 2683-84-3, Chlorin

7664-41-7, Ammonia, analysis 10102-44-0, Nitrogen dioxide, analysis

RL: ANT (Analyte); ANST (Analytical study)

(evaluation of cobalt oxide **based** gas sensors on **silicon substrate** for operation at low temps.)

IT 1307-96-6, Cobaltous oxide, uses 1308-06-1, Cobalt oxide (Co₃O₄)

RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)

(evaluation of cobalt oxide **based** gas sensors on **silicon substrate** for operation at low temps.)

IT 7440-21-3, Silicon, analysis

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)

(evaluation of cobalt oxide **based** gas sensors on **silicon substrate** for operation at low temps.)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

DOCUMENT NUMBER: 139:372512
 TITLE: Electrical characterization of organic
 semiconductor films by in
 situ field-effect measurements
 AUTHOR(S): Kudo, Kazuhiro
 CORPORATE SOURCE: Department of Electronics and Mechanical
 Engineering, Faculty of Engineering, Chiba
 University, Inage-ku, Chiba, 263-8522, Japan
 SOURCE: Nanotechnology and Nano-Interface Controlled
 Electronic Devices, [International Workshop on
 Nanotechnology and NICE Devices], Nagoya,
 Japan, Mar. 19-20, 2002 (2003), Meeting Date
 2002, 157-179. Editor(s): Iwamoto, Mitsumasa;
 Kaneto, Keiichi; Mashiko, Shiro. Elsevier
 Science B.V.: Amsterdam, Neth.
 CODEN: 69EGTQ; ISBN: 0-444-51091-5

DOCUMENT TYPE: Conference
 LANGUAGE: English

AB In situ field-effect measurement was used to evaluate the basic elec. parameters of several kinds of organic **semiconductor** thin films. The effects of thermal treatment and introducing oxygen gas on the elec. properties were also determined. A significant change in the elec. parameters corresponding to the adsorption and desorption of oxygen mols. was observed. The variation of the elec. properties strongly depended on the mol. structure and the growth conditions of the films. These results show that the effect of atmospheric gases is significant for organic device applications and the in situ field-effect measurement is a powerful method to investigate the fundamental properties of organic materials.

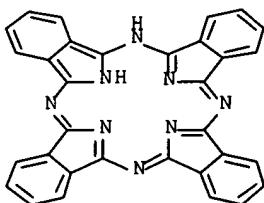
ED Entered STN: 03 Aug 2003

IT 574-93-6, Phthalocyanine

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYR (Physical process); PROC (Process); USES (Uses)
 (film; elec. characterization of organic
 semiconductor films by in situ field-effect
 measurements)

RN 574-93-6 HCAPLUS

CN 29H,31H-Phthalocyanine (9CI) (CA INDEX NAME)



IT 7440-21-3, Silicon, uses

RL: DEV (Device component use); USES (Uses)
 (substrate; elec. characterization of organic
 semiconductor films by in situ field-effect
 measurements)

RN 7440-21-3 HCAPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 76-3 (Electric Phenomena)
 ST org **semiconductor** FET Schottky diode carrier concn

mobility
 IT Electric current carriers
 (concentration; elec. characterization of organic **semiconductor**
 films by in situ field-effect measurements)
 IT Annealing
 Controlled atmospheres
 Heat treatment
 Molecular structure-property relationship
 (effect on elec. properties of organic **semiconductor**
 films)
 IT Electric conductivity
 Electric current-potential relationship
 Electric field effects
 Field effect transistors
 Hole concentration
 Hole mobility
 Schottky diodes
Semiconductor materials
 Thickness
 Vapor deposition process
 (elec. characterization of organic **semiconductor**
 films by in situ field-effect measurements)
 IT Electric current carriers
 (mobility; elec. characterization of organic **semiconductor**
 films by in situ field-effect measurements)
 IT Adsorption
 Desorption
 (of oxygen; effect on elec. properties of organic
semiconductor films)
 IT 83054-80-2
 RL: DEV (Device component use); PEP (Physical, engineering or
 chemical process); PYP (Physical process); PROC (Process); USES
 (Uses)
 (BPPC; elec. characterization of organic **semiconductor**
 films by in situ field-effect measurements)
 IT 7782-44-7, Oxygen, processes
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical
 process); PROC (Process)
 (adsorption; effect on elec. properties of organic
semiconductor films)
 IT 7440-57-5, Gold, uses 7440-74-6, Indium, uses
 RL: DEV (Device component use); USES (Uses)
 (contacts; elec. characterization of organic **semiconductor**
 films by in situ field-effect measurements)
 IT 81-33-4, PTCDI 128-69-8, PTCDA 65181-78-4, TPD 123847-85-8,
 α-NPD 124729-98-2, m-MTDATA
 RL: DEV (Device component use); PEP (Physical, engineering or
 chemical process); PYP (Physical process); PROC (Process); USES
 (Uses)
 (elec. characterization of organic **semiconductor**
 films by in situ field-effect measurements)
 IT 7631-86-9, Silica, uses
 RL: DEV (Device component use); USES (Uses)
 (film; elec. characterization of organic
semiconductor films by in situ field-effect
 measurements)
 IT 147-14-8, Copper **phthalocyanine** 574-93-6,
 Phthalocyanine 14916-87-1 15187-16-3, Lead
 phthalocyanine 21155-21-5 23236-18-2 25962-03-2
 RL: DEV (Device component use); PEP (Physical, engineering or
 chemical process); PYP (Physical process); PROC (Process); USES
 (Uses)
 (film; elec. characterization of organic
semiconductor films by in situ field-effect
 measurements)
 IT 7440-21-3, Silicon, uses

RL: DEV (Device component use); USES (Uses)
 (substrate; elec. characterization of organic
 semiconductor films by in situ field-effect
 measurements)

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L113 ANSWER 12 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2002:473703 HCPLUS Full-text
 DOCUMENT NUMBER: 137:225092
 TITLE: Oxygen and ozone oxidation-enhanced field
 emission of carbon nanotubes
 AUTHOR(S): Kung, Sheng-Chin; Hwang, Kuo Chu; Lin, I. Nan
 CORPORATE SOURCE: Department of Chemistry, National Tsing Hua
 University, Hsinchu, Taiwan
 SOURCE: Applied Physics Letters (2002), 80(25),
 4819-4821
 CODEN: APPLAB; ISSN: 0003-6951
 PUBLISHER: American Institute of Physics
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB Vertically aligned carbon nanotube (CNT) arrays were grown on p-type **silicon wafer** using acetylene and iron **phthalocyanine** as the sources of hydrocarbons and catalysts, resp. The CNT arrays were treated by chemical reagents, such as oxygen (O₂), ozone (O₃), **bromine**, and acids. When treated by O₂ and O₃, the emission current of the CNT array was increased .apprx.800% along with a decrease of the onset field emission voltage from 0.8 to 0.6 V/ μ m. Other chemical treatments, e.g., **bromination** and acid oxidation, lead to poorer field emission performance. The effects of these chemical processes on the field emission properties of CNT arrays will be discussed.

ED Entered STN: 25 Jun 2002

CC 76-12 (Electric Phenomena)

IT Semiconductor devices

(silicon-wafer; growing of vertically
 aligned carbon nanotube arrays on p-type **silicon**
wafer using acetylene and iron **phthalocyanine**
 as hydrocarbon source and catalyst)

IT 132-16-1, Iron **phthalocyanine**

RL: CAT (Catalyst use); USES (Uses)
 (growing of vertically aligned carbon nanotube arrays on p-type
 silicon **wafer** using acetylene and iron
phthalocyanine as hydrocarbon source and catalyst)

IT 74-86-2, Acetylene, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical
 process); RCT (Reactant); PROC (Process); RACT (Reactant or
 reagent)
 (growing of vertically aligned carbon nanotube arrays on p-type
 silicon **wafer** using acetylene and iron
phthalocyanine as hydrocarbon source and catalyst)

IT 7726-95-6, **Bromine**, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical
 process); RCT (Reactant); PROC (Process); RACT (Reactant or
 reagent)
 (treatment of vertically aligned carbon nanotube arrays with
bromine and its effect on emission current)

REFERENCE COUNT: 29 THERE ARE 29 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L113 ANSWER 13 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2002:540767 HCPLUS Full-text
 DOCUMENT NUMBER: 137:271404
 TITLE: Chemical gas sensors based on organic
 semiconductor polypyrrole
 AUTHOR(S): Potje-Kamloth, Karin
 CORPORATE SOURCE: Questos AG, Ottobrunn, 85521, Germany

SOURCE: Critical Reviews in Analytical Chemistry
 (2002), 32(2), 121-140
 CODEN: CCACBB; ISSN: 1040-8347

PUBLISHER: CRC Press LLC
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB Polypyrrole (PPy) is one of the most studied conducting polymers. It is well known that the mech., phys., and chemical properties of PPy strongly depend on the nature of the dopant anion. In this context, an overview of the influence of small anions and metallocycles, for example, **metallophthalocyanines** (MPcTS), on the chemical transducer behavior of the doped PPy layer studied by the Kelvin Probe method is given. The gas-polymer interaction changes the work function of the polymer, which can be explained by a secondary doping of the polymer by the adsorbed gas mol. Studies have revealed that the central metal ion in MPcTS plays an important role in the chemical sensing properties toward NO₂, chlorinated hydrocarbons, and organophosphorous compds. in the low ppm concentration range. Further, the competitive doping method of PPy with a mixture of small anions and MPcTS strongly enhances the selectivity and reduces the response time of the conducting polymer, which are general problems in the use of conducting organic polymers for gas and vapor detection. Chemical sensitive PPy layers have been used to build chemical sensors in which the organic **semiconductor** works both as the active component in the electronic device structure and as the chemical sensing transducer element, for example, polymer FET transistors, PPy/Au-Schottky, and PPy/Si-heterojunction diodes. The junction parameters of the polymer-based diodes, as the ideality and the rectification factor, are strongly influenced by the dopant of the conducting polymer. In both forward bias and reverse bias, these junctions exhibit a significant, fast, and reversible response to NO₂ gas, which can be explained by changes in the barrier height and in the charge carrier concentration of the PPy layer due to NO₂ interaction.

ED Entered STN: 21 Jul 2002

CC 76-14 (Electric Phenomena)

IT Gas sensors

(chemical gas sensors based on organic **semiconductor**
 polypyrrole)

IT 30604-81-0, Polypyrrole

RL: DEV (Device component use); USES (Uses)
 (chemical gas sensors based on organic **semiconductor**
 polypyrrole)

IT 10102-44-0, Nitrogen dioxide, analysis

RL: ANT (Analyte); ANST (Analytical study)
 (chemical gas sensors based on organic **semiconductor**
 polypyrrole for NO₂)

REFERENCE COUNT: 59 THERE ARE 59 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L113 ANSWER 14 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:299617 HCPLUS Full-text

DOCUMENT NUMBER: 137:131953

TITLE: Time-resolved photoelectrochemical
 measurements and photovoltaic efficiency of
 electrochemically self-assembled ZnO-dye
 electrodes

AUTHOR(S): Schlettwein, Derck; Oekermann, Torsten;
 Tsukasa, Yoshida; Sugiura, Takashi; Minoura,
 Hideki; Woehrle, Dieter

CORPORATE SOURCE: Institute of Applied and Physical Chemistry,
 Department of Chemistry, University of Bremen,
 Bremen, D-28334, Germany

SOURCE: Proceedings of SPIE-The International Society
 for Optical Engineering (2002), 4465(Organic
 Photovoltaics II), 76-84

CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical

Engineering

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Dye-modified ZnO thin films were prepared by electrochem. induced crystallization from aqueous mixts. of zinc nitrate and water-soluble dyes. A direct crystallization of **semiconductor**/ dye composites without heat treatment is seen as a significant advantage of this method. Moreover, characterization of these materials has revealed ordered growth of ZnO crystallites as well as formation of ordered dye assemblies, thus characterizing this method as electrochem. self-assembly. The photoelectrochem. properties of these unique ZnO-dye thin film electrodes were investigated in photocurrent transient measurements in the ms-regime and by steady-state voltammetric measurements. Two sets of electrodes are discussed, employing either metal complexes of **tetrasulfophthalocyanines** (TSPcMt; Mt = Zn, Al, Si) or the xanthene dye Eosin Y. For aggregates of TSPcMt on ZnO, efficient charge-transfer to the electrolyte is found, leading to low **surface** charging and low **surface** recombination of photogenerated holes with electrons from the ZnO, at however, rather low injection efficiencies of electrons into the conduction band of ZnO. This efficiency was higher for adsorbed monomers of TSPcMt leading to a considerably higher quantum efficiency of the photocurrent in spite of increased **surface** charging and recombination of holes. Higher photocurrents were observed for ZnO sensitized with monomers of Eosin Y caused by both, efficient electron transfer from the dye to ZnO as well as hole transfer from the dye to the electrolyte. Not only dye mols. which were directly accessible from the electrolyte, but also those which were enclosed within matrix cavities proved to be photoelectrochem. active.

ED Entered STN: 22 Apr 2002

CC 74-1 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

Section cross-reference(s): 72

IT 7553-56-2, **Iodine**, processes 14900-04-0, Iodide(I31-)
 RL: CPS (Chemical process); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PYR (Physical process); FORM (Formation, nonpreparative); PROC (Process)
 (time-resolved photoelectrochem. and photovoltaic efficiency of electrochem. self-assembled ZnO-dye electrodes)

REFERENCE COUNT: 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L113 ANSWER 15 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:287093 HCPLUS Full-text

DOCUMENT NUMBER: 136:379104

TITLE: NO₂ sensing behavior of **phthalocyanine** thin **film** sensors

AUTHOR(S): Yokoi, H.; Hayashi, C.; Oshima, T.; Ogawa, H.; Sadaoka, Y.

CORPORATE SOURCE: R&D Center, NGK Spark Plug Co., Ltd., Komaki, Aichi, 485-8510, Japan

SOURCE: Chemical Sensors (2001), 17(Suppl. B), 218-220
 CODEN: KAGSEU

PUBLISHER: Denki Kagakkai Kagaku Sensa Kenkyukai

DOCUMENT TYPE: Journal

LANGUAGE: English

AB NO₂ sensing behavior of thin **films** of **phthalocyanines** having various central metals (MPC, M = Co, Cu, Zn, and Pb) was investigated comparing with that of a SnO₂ thin **film** from the viewpoint of a sensor for air quality controls in automobile cabins. The MPC and SnO₂ thin **films** were deposited by vacuum sublimation and by sputtering on micromachined silicon substrates, resp. Both thin **film** sensors were subjected to model gas tests and road tests to evaluate their NO₂ sensing performance. Among the MPC thin **films** tested, ZnPc and CuPc showed higher sensitivity to NO₂ than the others. I.e., the sensitivity to NO₂ was high when the metal of which dx₂-y₂ orbital was filled was selected. Although the model gas tests revealed that the recovery speeds after exposure of NO₂ gas to the base line of the MPC thin **film** sensors were slower than that of the SnO₂ thin **film** sensor, the road tests demonstrated that their response to the NO₂ gas and recovery speeds were a practical level enough. The reasons could be attributed to the effects of a short time heat cleaning with a built-in microheater before measurement and a co-existence of oxidizing and reducing gases in the ambient atmospheric that facilitates to release adsorbed gases on the MPC each other. It was concluded that MPC has a potential as a NO₂ sensing material of air quality sensors for automobile applications.

ED Entered STN: 18 Apr 2002

IT 7440-21-3, Silicon, analysis

10/0400059

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(substrate; NO₂ sensing behavior of
phthalocyanine thin film sensors on)
RN 7440-21-3 HCAPLUS
CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 79-2 (Inorganic Analytical Chemistry)
ST metal phthalocyanine nitrogen dioxide gas sensor
performance
IT Semiconductor gas sensors
(NO₂ sensing behavior of phthalocyanine thin
film sensors)
IT Metallophthalocyanines
RL: ARU (Analytical role, unclassified); DEV (Device component
use); ANST (Analytical study); USES (Uses)
(NO₂ sensing behavior of phthalocyanine thin
film sensors)
IT 10102-44-0, Nitrogen dioxide, analysis
RL: ANT (Analyte); ANST (Analytical study)
(NO₂ sensing behavior of phthalocyanine thin
film sensors)
IT 147-14-8, Copper phthalocyanine 3317-67-7, Cobalt
phthalocyanine 14320-04-8, Zinc phthalocyanine
15187-16-3, Lead phthalocyanine
RL: ARU (Analytical role, unclassified); DEV (Device component
use); ANST (Analytical study); USES (Uses)
(NO₂ sensing behavior of phthalocyanine thin
film sensors)
IT 7440-21-3, Silicon, analysis
RL: ARU (Analytical role, unclassified); DEV (Device component
use); ANST (Analytical study); USES (Uses)
(substrate; NO₂ sensing behavior of
phthalocyanine thin film sensors on)

REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L113 ANSWER 16 OF 72 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2000:371233 HCAPLUS Full-text
DOCUMENT NUMBER: 133:112908
TITLE: Dissociation of Al₂O₃(0001) substrates
and the roles of silicon and oxygen
in n-type GaN thin solid films grown by
gas-source molecular beam epitaxy
AUTHOR(S): Van Nostrand, J. E.; Solomon, J.; Saxler, A.;
Xie, Q.-H.; Reynolds, D. C.; Look, D. C.
CORPORATE SOURCE: Air Force Research Laboratory, Materials and
Manufacturing Directorate, Wright-Patterson
Air Force Base, OH, 45433, USA
SOURCE: Journal of Applied Physics (2000), 87(12),
8766-8772
CODEN: JAPIAU; ISSN: 0021-8979
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Unintentionally doped and silicon doped GaN films prepared by mol. beam epitaxy using ammonia are investigated. Hall, secondary ion mass spectroscopy (SIMS), photoluminescence, and x-ray data are utilized for anal. of sources of autodoping of GaN epitaxial films in an effort to identify whether the n-type background electron

concentration is of impurity origin or native defect origin. We identify and quantify an anomalous relationship between the Si doping concentration and free carrier concentration and mobility using temperature dependent Hall measurements on a series of 2.0- μm -thick GaN(0001) films grown on sapphire with various Si doping concns. SIMS is used to identify oxygen as the origin of the excess free carriers in lightly doped and undoped GaN films. Further, the source of the oxygen is pos. identified to be dissociation of the sapphire substrate at the nitride-sapphire interface. Dissociation of SiC at the nitride-carbide interface is also observed. Finally, SIMS is again utilized to show how Si doping can be utilized to suppress the diffusion of the oxygen into the GaN layer from the sapphire substrate. The mechanism of suppression is believed to be formation of a Si-O bond and a greatly reduced diffusion coefficient of the subsequent Si-O complex in GaN.

ED Entered STN: 05 Jun 2000
 CC 76-2 (Electric Phenomena)
 ST gallium nitride growth alumina substrate
 IT Semiconductor materials
 (dissociation of Al2O3(0001) substrates and roles of silicon and oxygen in n-type GaN thin solid films grown by gas-source mol. beam epitaxy)
 IT 1317-82-4, Sapphire 1344-28-1, Alumina, processes
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (dissociation of Al2O3(0001) substrates and roles of silicon and oxygen in n-type GaN thin solid films grown by gas-source mol. beam epitaxy)
 IT 25617-97-4P, Gallium nitride GaN
 RL: PNU (Preparation, unclassified); PREP (Preparation)
 (dissociation of Al2O3(0001) substrates and roles of silicon and oxygen in n-type GaN thin solid films grown by gas-source mol. beam epitaxy)

REFERENCE COUNT: 36 THERE ARE 36 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L113 ANSWER 17 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2000:483101 HCPLUS Full-text
 DOCUMENT NUMBER: 133:216373
 TITLE: Isolating, imaging, and electrically characterizing individual organic molecules on the Si(100) surface with the scanning tunneling microscope
 AUTHOR(S): Hersam, M. C.; Guisinger, N. P.; Lyding, J. W.
 CORPORATE SOURCE: Department of Electrical and Computer Engineering and Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign, Urbana, IL, 61801, USA
 SOURCE: Journal of Vacuum Science & Technology, A: Vacuum, Surfaces, and Films (2000), 18(4, Pt. 1), 1349-1353
 PUBLISHER: American Institute of Physics
 DOCUMENT TYPE: Journal
 LANGUAGE: English
 AB Mol. electronics shows great potential as an approach for fabricating nanoelectronic devices and circuits. Despite this potential, many fundamental problems remain unsolved. This article outlines a 3 pronged approach that addresses key mol. electronic issues for mols. supported on ultrahigh vacuum scanning tunneling microscopy (UHVSTM) patterned H passivated Si(100) surfaces. First, feedback controlled lithog. (FCL) has been developed as a reliable technique for making templates of individual dangling bonds on the Si(100)-2+1:H surface. FCL detects individual H desorption events while patterning, thereby compensating for variations in tip structure. When the surface is then exposed to a flux of mols., they bind individually to the pre-patterned sites. With this technique, norbornadiene and Cu phthalocyanine (CuPc) mols. have been intentionally isolated into predefined patterns. STM images reveal intramol. detail and suggest mech. behavior such as mol. rotation. Second, using STM spectroscopy, mols.' electronic properties have been

revealed. Filled state tunneling conductance maps of CuPc mols. exhibit an enhanced d. of electronic states. However, in empty states, a ring of reduced local d. of states surrounds each CuPc mol. Finally, an all-UHV scheme for isolating and, ultimately, elec. contacting STM-patterned nanostructures has been developed that uses a predefined p-n junction on a Si (100) **substrate**. With STM-potentiometry, the junction is easily located, allowing for efficient registration of nanostructures after intermediate processing steps. By STM patterning across the depletion region, the elec. properties of selectively deposited nanostructures can be directly evaluated when the p-n junction is reverse biased.

ED Entered STN: 18 Jul 2000
 IT 7440-21-3, Silicon, miscellaneous
 RL: MSC (Miscellaneous)
 (isolating, imaging, and elec. characterizing individual organic mols. on Si(100) **surface** with scanning tunneling microscope)
 RN 7440-21-3 HCPLUS
 CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 76-14 (Electric Phenomena)
 Section cross-reference(s): 66
 ST imaging org mol Si **surface** scanning tunneling microscopy
 IT Lithography
 (feedback-controlled; isolating, imaging, and elec. characterizing individual organic mols. on Si(100) **surface** with scanning tunneling microscope)
 IT Density of states
 Desorption
 Molecular electronics
 Molecular rotation
 Potentiometry
 Scanning tunneling microscopy
 Semiconductor junctions
 Semiconductor nanostructures
 Tunneling conductance
 (isolating, imaging, and elec. characterizing individual organic mols. on Si(100) **surface** with scanning tunneling microscope)
 IT p-n Semiconductor junctions
 (nanoscale detection of; isolating, imaging, and elec. characterizing individual organic mols. on Si(100) **surface** with scanning tunneling microscope)
 IT 7440-21-3, Silicon, miscellaneous
 RL: MSC (Miscellaneous)
 (isolating, imaging, and elec. characterizing individual organic mols. on Si(100) **surface** with scanning tunneling microscope)
 IT 121-46-0, Norbornadiene 147-14-8, Copper phthalocyanine
 RL: PRP (Properties)
 (isolating, imaging, and elec. characterizing individual organic mols. on Si(100) **surface** with scanning tunneling microscope)

REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L113 ANSWER 18 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2000:481893 HCPLUS Full-text
 DOCUMENT NUMBER: 133:315983
 TITLE: Implications of atomic-level manipulation on

the **Si(100) surface**: From enhanced CMOS reliability to molecular nanoelectronics

AUTHOR(S): Hersam, M. C.; Lee, J.; Guisinger, N. P.; Lyding, J. W.

CORPORATE SOURCE: Department of Electrical and Computer Engineering and Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign, Urbana, IL, 61801, USA

SOURCE: Superlattices and Microstructures (2000), 27(5/6), 583-591
CODEN: SUMIEK; ISSN: 0749-6036

PUBLISHER: Academic Press

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The ultra-high vacuum scanning tunneling microscope (UHVSTM) was used to induce desorption of H from the **Si (100)-2X1:H surface** with atomic-level precision. The study of the desorption mechanism led to the discovery of a substantial isotope effect between H and D, which has recently been employed to minimize hot electron degradation at the Si/ SiO₂ interface in conventional complementary metal-oxide-semiconductor (CMOS) circuits. This paper will reveal secondary ion mass spectroscopy (SIMS) data that show a direct correlation between D incorporation at this interface and transistor lifetime. D incorporation can be enhanced via high-pressure processing, which led to lifetime improvements >700 + for Samsung's latest 0.18 μ m, 1.5 V CMOS technol. In addition to enhancing current integrated circuits, UHVSTM-induced **hydrogen** desorption has aided the development of nanoelectronics on the mol.-size scale. Feedback-controlled lithog. (FCL) has refined the desorption process to the point where templates of individual dangling bonds can be generated in arbitrary geometries. The chemical contrast between dangling bonds and **H-passivated Si** is then used to isolate individual copper **phthalocyanine** (CuPc) and C₆₀ mols. on the **Si(100) surface**. Following isolation, STM spectroscopy has characterized the mech. and elec. properties of these mols. with intra -mol. precision. (c) 2000 Academic Press.

ED Entered STN: 18 Jul 2000

IT 7440-21-3, **Silicon**, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(implications of atomic-level manipulation on the **Si (100) surface**: from enhanced CMOS reliability to mol. nanoelectronics)

RN 7440-21-3 HCPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 76-3 (Electric Phenomena)

ST STM **silicon surface** atomic level manipulation
CMOS device

IT MOS devices
(complementary; implications of atomic-level manipulation on the **Si(100) surface**: from enhanced CMOS reliability to mol. nanoelectronics)

IT Integrated circuits
Interfacial structure
Isotope effect
Microelectronics
Passivation
Scanning tunneling microscopy
Secondary-ion mass spectrometry
Transistors
(implications of atomic-level manipulation on the **Si (100) surface**: from enhanced CMOS reliability to mol. nanoelectronics)

10/0400059

IT 147-14-8, Copper **phthalocyanine** 7440-21-3,
Silicon, uses 7631-86-9, Silica, uses 99685-96-8,
Fullerene
RL: DEV (Device component use); TEM (Technical or engineered
material use); USES (Uses)
(implications of atomic-level manipulation on the **Si**
(100) **surface**: from enhanced CMOS reliability to mol.
nanoelectronics)

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L113 ANSWER 19 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 1998:516429 HCPLUS Full-text
DOCUMENT NUMBER: 129:224390
TITLE: Dicing **semiconductor** wafers using
adhesive films
INVENTOR(S): Fukumoto, Hideki; Fujii, Seiji; Kataoka,
Makoto; Hirai, Kentaro
PATENT ASSIGNEE(S): Mitsui Chemicals Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 14 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

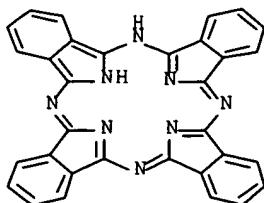
| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|-------------|------|----------|-----------------|--------------|
| JP 10214800 | A | 19980811 | JP 1997-15296 | 1997 0129 |
| JP 3695874 | B2 | 20050914 | JP 1997-15296 | 1997 0129 |

PRIORITY APPLN. INFO.:

AB Adhesive **films**, where UV-hardening-type adhesives are **coated** on **base** **films**, are attached to **semiconductor** wafers, the wafers are diced into chips, and the adhesive **films** are exposed to UV radiation to lose adhesiveness somewhat and removed. The **base** **films** contain **phthalocyanine**-type coloring agents.
ED Entered STN: 19 Aug 1998
IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); USES (Uses)
(dicing **semiconductor** wafers using adhesive
films)
RN 7440-21-3 HCPLUS
CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

IT 574-93-6, Phthalocyanine
RL: DEV (Device component use); USES (Uses)
(dicing **semiconductor** wafers using adhesive
films with UV-hardening **bases** containing)
RN 574-93-6 HCPLUS
CN 29H,31H-Phthalocyanine (9CI) (CA INDEX NAME)



IC ICM H01L021-301
 ICS C09J005-00; C09J007-02
 CC 76-3 (Electric Phenomena)
 ST dicing **semiconductor** wafer adhesive film; UV
 hardening adhesive film wafer dicing;
 phthalocyanine coloring adhesive film wafer
 dicing
 IT Adhesive films
 Semiconductor devices
 (dicing **semiconductor** wafers using adhesive
 films)
 IT UV radiation
 (dicing **semiconductor** wafers using adhesive
 films with UV-hardening **bases**)
 IT 7440-21-3, Silicon, uses
 RL: DEV (Device component use); USES (Uses)
 (dicing **semiconductor** wafers using adhesive
 films)
 IT 574-93-6, Phthalocyanine
 RL: DEV (Device component use); USES (Uses)
 (dicing **semiconductor** wafers using adhesive
 films with UV-hardening **bases** containing)

L113 ANSWER 20 OF 72 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 1998:248992 HCAPLUS Full-text
 DOCUMENT NUMBER: 128:302716
 TITLE: Space charge analysis in doped zinc
 phthalocyanine thin films
 AUTHOR(S): Remaki, Boudjemaa; Guillaud, Gerard; Mayes,
 Denise
 CORPORATE SOURCE: Laboratoire d'Electronique Solides, Universite
 Claude Bernard - Lyon, Villeurbanne, F-69622,
 Fr.
 SOURCE: Optical Materials (Amsterdam) (1998), 9(1-4),
 240-244
 CODEN: OMATET; ISSN: 0925-3467
 PUBLISHER: Elsevier Science B.V.
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB The authors present an improved method for the determination of the space charge d. in organic **semiconductors** used as active layers in Schottky barriers. These measurements provide a powerful tool for the interpretation of **basic** properties such as the rectifying effect, doping process and carrier trapping mechanisms of **films** together with a way to assess the potential for sensor applications. Metal/mol. **semiconductor** Schottky junctions were prepared on zinc **phthalocyanine** layers doped by a controlled exposure to the ambient air. The organic material is deposited on aluminum or heavily doped **silicon substrates**, in order to make a Schottky barrier (film thickness around 1 μ m). An ohmic contact is obtained by a gold deposition on the strongly doped side of the mol. material. The current-voltage and capacitance-voltage characteristics have been investigated. The results are interpreted in terms of a space charge region at the interface with the **substrate**, followed by an extended semi-insulating layer. The contribution of these two regions to the total impedance is analyzed in well improved conditions of measurements.

ED Entered STN: 02 May 1998
 IT 7440-21-3, Silicon, uses

10/0400059

RL: TEM (Technical or engineered material use); USES (Uses)
(space charge anal. in doped zinc phthalocyanine thin
films used in Schottky barriers)
RN 7440-21-3 HCAPLUS
CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 76-3 (Electric Phenomena)
ST Schottky junction zinc phthalocyanine space charge
IT Semiconductor materials
(organic; space charge anal. in doped zinc phthalocyanine
thin films used in Schottky barriers)
IT Electric capacitance-potential relationship
Electric current-potential relationship
Schottky barrier
Schottky semiconductor junctions
Space charge
(space charge anal. in doped zinc phthalocyanine thin
films used in Schottky barriers)
IT 7429-90-5, Aluminum, uses 7440-21-3, Silicon,
uses 7440-57-5, Gold, uses 14320-04-8, Zinc
phthalocyanine
RL: TEM (Technical or engineered material use); USES (Uses)
(space charge anal. in doped zinc phthalocyanine thin
films used in Schottky barriers)

REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L113 ANSWER 21 OF 72 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 1997:169205 HCAPLUS Full-text
DOCUMENT NUMBER: 126:232836
TITLE: Chemical detector employing surface plasmon
resonance excited using an optical waveguide
configured as an asymmetric waveguide coupler
INVENTOR(S): Groger, Howard P.; Weiss, Martin; Lo, Peter;
Thomas, Bruce L.

PATENT ASSIGNEE(S): American Research Corporation of Virginia, USA
SOURCE: U.S., 15 pp.

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------------------|------|----------|-----------------|--------------|
| ----- | ---- | ----- | ----- | |
| US 5606633 | A | 19970225 | US 1995-495764 | 1995 0626 |
| PRIORITY APPLN. INFO.: | | | US 1995-495764 | 1995 0626 |

AB A highly sensitive surface plasmon waveguide sensor monitors the refractive index and thickness of thin adsorbed films. The sensor includes an optical waveguide formed by ion-exchange in a glass substrate, by selective densification of substrate material or by the incorporation of high refractive index materials during deposition of a dielec. layer. Two dielec. thin films are deposited on top of the waveguide. The layer closest to the waveguide has a lower refractive index than the guiding layer to form a

buffer layer. The 2nd dielec. layer, or tuning layer, has a higher refractive index. The tuning and buffer layers allow optimization of the resonance wavelength, full-width half maximum of the resonance wavelength range and amplitude of the resonance. The tuning layer is coated with a thin metallic layer, to effect surface plasmon resonance, such as gold, silver, aluminum or one or more semiconducting materials. Alternatively the optical waveguide is coated with the buffer layer and the thin metal layer. The tuning layer and a 2nd buffer layer are deposited on top of the metallic layer. Light is introduced to the waveguide and interaction between the light and the thin metal layer results in attenuation of the TM polarization. The ratio of the TM and TE polarization intensities is monitored by a polarization beam splitter. The relatively unchanged TE polarization intensity serves as an integral reference for the sensor. The sensor has numerous applications in the environmental and biomedical fields.

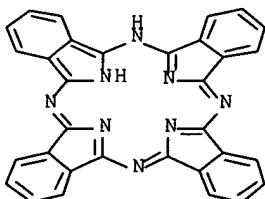
ED Entered STN: 13 Mar 1997

IT 574-93-6, Phthalocyanine

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
 (thickness and refractive index determination of adsorbed films by surface plasmon waveguide sensor based on measurement of extinction ratio at 2 wavelengths)

RN 574-93-6 HCAPLUS

CN 29H,31H-Phthalocyanine (9CI) (CA INDEX NAME)



IC ICM G02B006-10

INCL 385012000

CC 79-2 (Inorganic Analytical Chemistry)

IT Polyoxyalkylenes, analysis

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
 (fluorine- and sulfo-containing, ionomers; thickness and refractive index determination of adsorbed films by surface plasmon waveguide sensor based on measurement of extinction ratio at 2 wavelengths)

IT Polyoxyalkylenes, analysis

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
 (fluorine-containing, sulfo-containing, ionomers; thickness and refractive index determination of adsorbed films by surface plasmon waveguide sensor based on measurement of extinction ratio at 2 wavelengths)

IT Ionomers

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
 (polyoxyalkylenes, fluorine- and sulfo-containing; thickness and refractive index determination of adsorbed films by surface plasmon waveguide sensor based on measurement of extinction ratio at 2 wavelengths)

IT 574-93-6, Phthalocyanine 1314-13-2, Zinc

oxide, analysis 1314-61-0, Tantalum oxide (Ta2O5) 1344-28-1, Aluminum oxide (Al2O3), analysis 7440-57-5, Gold, analysis 7631-86-9, Silica, analysis 7782-40-3, Diamond, analysis 9004-54-0D, Dextran, carboxylated, analysis 9011-14-7, Poly(methyl methacrylate) 12033-89-5, Silicon nitride, analysis 13463-67-7, Titanium oxide (TiO2), analysis
 RL: ARU (Analytical role, unclassified); DEV (Device component

use); ANST (Analytical study); USES (Uses)
 (thickness and refractive index determination of adsorbed films by
 surface plasmon waveguide sensor based on
 measurement of extinction ratio at 2 wavelengths)

L113 ANSWER 22 OF 72 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 1997:693881 HCAPLUS Full-text
 DOCUMENT NUMBER: 127:340512
 TITLE: Amorphous **semiconductors** suitable
 for solar cells, electrophotography and image
 sensors
 INVENTOR(S): Higashi, Masanobu
 PATENT ASSIGNEE(S): Tokuyama Soda Co., Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------------------|------|----------|-----------------|--------------|
| JP 09275222 | A | 19971021 | JP 1996-83765 | 1996 0405 |
| PRIORITY APPLN. INFO.: | | | JP 1996-83765 | 1996 0405 |

AB The **semiconductors** have an amorphous **Si substrate**, containing 0.1-5.0 atomic% Cl, having optical gap 1.9-2.5 eV, and 5.0-15 vol% void, and ≥ 1 i type amorphous **Si** layers containing, 0.005-0.1 atomic% Cl, having optical gap 1.6-1.9 eV, and 0.01-5.0 volume% void on the **substrate**. These **semiconductors** have high photocond., high conversion efficiency for a wide range of light wavelength, and high stability.

ED Entered STN: 03 Nov 1997

IT 7440-21-3, Silicon, properties

RL: PRP (Properties); TEM (Technical or engineered material use);
 USES (Uses)

(chlorin doped amorphous silicon
 semiconductors suitable for solar cells and electronic
 photog. and image sensors)

RN 7440-21-3 HCAPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

IC ICM H01L031-04
 ICS H01L027-146; H01L021-205
 CC 76-3 (Electric Phenomena)
 ST Section cross-reference(s): 52, 74
 solar cell **semiconductor silicon**
 chlorine doped; electronic photog **semiconductor**
silicon chlorine doped; image sensor
semiconductor silicon chlorine doped
 IT Electrophotography
 Optical imaging sensors
 Semiconductor materials
 Solar cells
 (chlorin doped amorphous silicon
 semiconductors suitable for solar cells and electronic
 photog. and image sensors)

IT 7782-50-5, Chlorine, uses
 RL: MOA (Modifier or additive use); USES (Uses)
 (chlorin doped amorphous silicon
 semiconductors suitable for solar cells and electronic
 photog. and image sensors)

IT 7440-21-3, Silicon, properties
 RL: PRP (Properties); TEM (Technical or engineered material use);
 USES (Uses)
 (chlorin doped amorphous silicon
 semiconductors suitable for solar cells and electronic
 photog. and image sensors)

L113 ANSWER 23 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1997:134217 HCPLUS Full-text
 DOCUMENT NUMBER: 126:151730
 TITLE: Electrically insulating material, interlayer
 insulating film, and manufacture of it
 INVENTOR(S): To, Yoichi
 PATENT ASSIGNEE(S): Sony Corp., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------------------|------|----------|-----------------|--------------|
| JP 08321217 | A | 19961203 | JP 1995-127656 | 1995 0526 |
| JP 3401993 | B2 | 20030428 | JP 1995-127656 | 1995 0526 |
| PRIORITY APPLN. INFO.: | | | | |

AB The material mainly contains **phtalocyanine** or its **Si** derivative, where ≥ 1 H binding to
 intermol. aromatic rings, is substituted with F. The film comprises the above
 material, and is used for **semiconductor** devices. The film is manufactured by placing a
 support in a chamber which is filled with vapors of above material, and polymerizing
 with plasma and simultaneously depositing on the support. The as-prepared insulating
 film shows excellent heat resistance, low dielec. constant, and good strength.

ED Entered STN: 28 Feb 1997

IT 7440-21-3DP, Silicon,
Perfluorophthalocyanine and
perfluoronaphthalocyanine homopolymers, processes
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or
 chemical process); TEM (Technical or engineered material use);
 PREP (Preparation); PROC (Process); USES (Uses)
 (**phtalocyanine-based** plasma polymer for
 elec. insulating film in **semiconductor** device)

RN 7440-21-3 HCPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

IC ICM H01B003-24
 ICS C08L083-00; H01L021-31
 CC 76-10 (Electric Phenomena)
 Section cross-reference(s): 35, 38
 ST elec insulator **phtalocyanine** plasma polymer;

fluorine substituted phthalocyanine polymer insulator

IT Polymers, processes
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use);
 PREP (Preparation); PROC (Process); USES (Uses)
 (insulating; phthalocyanine-based plasma polymer for elec. insulating film in semiconductor device)

IT Electronic packaging materials
 Electronic packaging process
 Semiconductor devices
 (phthalocyanine-based plasma polymer for elec. insulating film in semiconductor device)

IT Polymerization
 (plasma; phthalocyanine-based plasma polymer for elec. insulating film in semiconductor device)

IT Electric insulators
 (polymeric; phthalocyanine-based plasma polymer for elec. insulating film in semiconductor device)

IT 7440-21-3DP, Silicon,
 Perfluorophthalocyanine and
 perfluoronaphthalocyanine homopolymers, processes
 27290-25-1DP, Phthalocyanine polymer,
 partial-F-substituted derivative 186541-17-3DP, tetramethoxy derivative
 186541-17-3P 186541-19-5P 186541-20-8P
 RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use);
 PREP (Preparation); PROC (Process); USES (Uses)
 (phthalocyanine-based plasma polymer for elec. insulating film in semiconductor device)

L113 ANSWER 24 OF 72 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1997:152193 HCAPLUS Full-text

DOCUMENT NUMBER: 126:202972

TITLE: Semiconductor polymer-

silicon heterojunction for gas sensing

AUTHOR(S): Tuyen, Le T. T.; Minh, Phan N.; Khoi, Phan H.;
 Potje-Kamloth, Karin; Liess, Hans-Dieter

CORPORATE SOURCE: Inst. Mater. Sci., Vietnam Natl. Cent. Natural
 Sci. Technol., Hanoi, Vietnam

SOURCE: Proceedings of the East Asia Conference on
 Chemical Sensors, 2nd, Xi'an, Peop. Rep.
 China, Oct. 5-8, 1995 (1995), 104-107.
 International Academic Publishers: Beijing,
 Peop. Rep. China.

CODEN: 64AXA3

DOCUMENT TYPE: Conference

LANGUAGE: English

AB The development of heterojunctions between semiconducting p-type polypyrrole and n-type silicon (PPy-Si) as sensors for detection of nitric oxide (NOx) gas in ambient is reported. The heterojunctions are formed by photoelectrochem. polymerization of polypyrrole from an aqueous solution in the presence of para-toluene sulfonate (TOS) or in the presence of electro-chemical active copper phthalocyanine sulfonate (CuPcTS) onto Si- substrate. The influence of processing parameters on the current-voltage (I-V) characteristics was studied. Upon exposure the heterojunction structure to the NOx gas, the I-V characteristics of the TOS-doped PPy-Si heterojunction show a voltage shift in the forward bias direction and that of the CuPcTS doped PPy-Si heterojunction - an increase in the reverse current. The NOx response is rapid and in general reversible at room temperature

ED Entered STN: 08 Mar 1997

IT 7440-21-3, Silicon, uses

RL: DEV (Device component use); USES (Uses)
 (semiconductor polymer-silicon
 heterojunction for gas sensing)

RN 7440-21-3 HCAPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 59-1 (Air Pollution and Industrial Hygiene)
 Section cross-reference(s): 76, 79
 ST **semiconductor** gas sensor polymer **silicon**
 heterojunction
 IT Air analysis
 Semiconductor gas sensors
 (**semiconductor** polymer-**silicon**
 heterojunction for gas sensing)
 IT 11104-93-1, Nitrogen oxide, analysis
 RL: ANT (Analyte); ANST (Analytical study)
 (**semiconductor** polymer-**silicon**
 heterojunction for gas sensing)
 IT 7440-21-3, **Silicon**, uses 30604-81-0,
 Polypyrrole
 RL: DEV (Device component use); USES (Uses)
 (**semiconductor** polymer-**silicon**
 heterojunction for gas sensing)

L113 ANSWER 25 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1993:614851 HCPLUS Full-text
 DOCUMENT NUMBER: 119:214851
 TITLE: DLTS measurements on metal/Langmuir-Blodgett
 films/**silicon** structures
 AUTHOR(S): Barancok, D.; Cirak, J.; Tomcik, P.; Brynda,
 E.; Nespurek, S.
 CORPORATE SOURCE: Fac. Electr. Eng., Slovak Tech. Univ.,
 Bratislava, Slovakia
 SOURCE: Physica Status Solidi A: Applied Research
 (1993), 138(1), 191-8
 CODEN: PSSABA; ISSN: 0031-8965

DOCUMENT TYPE: Journal
 LANGUAGE: English
 AB Deep level transient spectroscopy (DLTS) is used in the case of metal/Langmuir-Blodgett
 film/**n-Si** structures (M-LB-Si). Cu tetra-4-tert-**butylphthalocyanine** (CuTTBPC) is
 incorporated as an insulator by a Langmuir-Blodgett technique on a **semiconductor n-type**
Si substrate ($Q \approx 5 \Omega \text{ cm}$). A vacuum-evaporated Au electrode forms the top metal
 contact (gate). The DLTS response exhibits 2 maximum corresponding to: a) the deep
 level of Au **dopant** in the bulk **Si substrate**, b) the states at the interface LB-Si which
 are introduced by individual operations used at a LB layer deposition. A comparison
 with conventional MIS structures is presented in terms of a phys. interpretation of
 exptl. results.

ED Entered STN: 13 Nov 1993
 IT 7440-21-3, **Silicon**, miscellaneous
 RL: MSC (Miscellaneous)
 (deep level transient spectroscopy of gold/Langmuir-Blodgett
 films structure with)
 RN 7440-21-3 HCPLUS
 CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 76-3 (Electric Phenomena)
 Section cross-reference(s): 66
 ST metal Langmuir Blodgett **silicon** deep level
 IT Electric capacitance
 (deep level transient spectroscopy, of metal/Langmuir-Blodgett

films/silicon structures)
 IT Energy level, band structure
 (d. of states, of metal/Langmuir-Blodgett films/silicon
 structures)
 IT 39001-64-4
 RL: USES (Uses)
 (deep level transient spectroscopy of Langmuir-Blodgett films
 of, in gold and silicon structure)
 IT 7440-57-5, Gold, miscellaneous
 RL: MSC (Miscellaneous)
 (deep level transient spectroscopy of Langmuir-Blodgett films
 on silicon structure with)
 IT 7440-21-3, Silicon, miscellaneous
 RL: MSC (Miscellaneous)
 (deep level transient spectroscopy of gold/Langmuir-Blodgett
 films structure with)

L113 ANSWER 26 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1992:461713 HCPLUS Full-text
 DOCUMENT NUMBER: 117:61713
 TITLE: Application of rod-like polymers with
 ionophores as Langmuir-Blodgett membranes for
 silicon-based ion sensors
 AUTHOR(S): Erbach, R.; Hoffmann, B.; Schaub, M.; Wegner,
 G.
 CORPORATE SOURCE: Inst. Technol. Elektrotech., Univ. Karlsruhe,
 Karlsruhe, D-7500/21, Germany
 SOURCE: Sensors and Actuators, B: Chemical (1992),
 B6(1-3), 211-16
 CODEN: SABCEB; ISSN: 0925-4005
 DOCUMENT TYPE: Journal
 LANGUAGE: English

AB By using special Langmuir-Blodgett films as a carrier for ionophores it is possible to manufacture highly sensitive and selective sensor membranes. As an example a Na sensor is presented with a constant sensitivity of 53 mV/pNa for more than 61 days and a small baseline drift of only 1 mV/day. This is achieved by mixing a com. Na ionophore with a stable LB material before film deposition. Best results are obtained with a cross-linked cover layer serving as a diffusion barrier for the ionophores but not for the ions to be detected. The same LB material as before but without ionophores can be used as a reference membrane in a new capacitive sensor system (CSS). The special advantage of the sensor system with sensor and reference membranes made of the same basic material is that the influence of disturbing ions in the electrolyte is automatically compensated. The presented sensor system can easily be produced at low cost. Miniaturization is possible. Two examples of the sensor system are given for pH and for Na measurements.

ED Entered STN: 08 Aug 1992
 IT 7440-21-3, Silicon, uses
 RL: USES (Uses)
 (in semiconductive ion sensors with Langmuir-Blodgett
 membranes)
 RN 7440-21-3 HCPLUS
 CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 79-2 (Inorganic Analytical Chemistry)
 Section cross-reference(s): 38, 72, 76
 ST Langmuir Blodgett membrane ion sensor; silicon
 based ion sensor; rod polymer ionophore ion sensor;
 potentiometric ion sensor; elec capacitor potentiometric ion
 sensor; sodium ion sensor potentiometric; pH sensor potentiometric
 IT Polymers, uses

RL: USES (Uses)
 (Langmuir-Blodgett films of, as ionophore carriers
 for electrochem. ion sensors)

IT Membranes
 (Langmuir-Blodgett, for silicon-based ion
 sensors)

IT Siloxanes and Silicones, uses
 RL: USES (Uses)
 (phthalocyanine group-containing, Langmuir-Blodgett
 films of, in electrochem. ion sensors)

IT Sensors
 (semiconductive, ion, with Langmuir-Blodgett
 membranes)

IT 83789-62-2
 RL: ANST (Analytical study)
 (Langmuir-Blodgett films of, as ionophore carriers in
 electrochem. sensors)

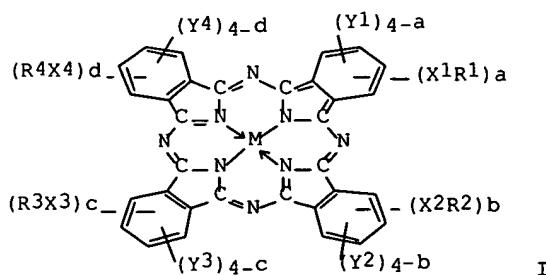
IT 142172-70-1
 RL: ANST (Analytical study)
 (Langmuir-Blodgett films of, in electrochem. ion
 sensors)

IT 7440-21-3, Silicon, uses 7631-86-9, Silica,
 uses 12033-89-5, Silicon nitride, uses
 RL: USES (Uses)
 (in semiconductive ion sensors with Langmuir-Blodgett
 membranes)

L113 ANSWER 27 OF 72 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 1988:501993 HCAPLUS Full-text
 DOCUMENT NUMBER: 109:101993
 TITLE: Optical information recording material
 INVENTOR(S): Shibano, Hiroshi; Yamazaki, Harumasa;
 Morikawa, Kenji
 PATENT ASSIGNEE(S): Kao Corp., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------------------|-------|----------|-----------------|--------------|
| ----- | ---- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- |
| JP 63039388 | A | 19880219 | JP 1986-183810 | 1986 0805 |
| PRIORITY APPLN. INFO.: | | | JP 1986-183810 | 1986 0805 |

GI



AB Recording layer of the title material contains **phthalocyanine I** ($R1-4 = C1-20$ alkyl, alkenyl, aryl, heterocycl; $X1-4 =$ Group IVa element; $Y1-4 = H, \text{halo}, NO_2, \text{cyano}, CO_2H$, sulfonyl, amino; $a,b,c,d = 0-4$ but not 0 simultaneously; M = metal, metal- or Si-containing divalent group, or 2 H atoms). I is solvent-soluble and stable, and forms layer sensitive to near-IR. Thus, hexadeca(n-pentylthio) **phthalocyanato** copper was synthesized and its 1:1 mixture with polystyrene was applied on glass substrate as 0.1- μ layer having max absorption at 788 nm. Irradiation with 780-nm **semiconductor** laser beam produced well-defined pit. Storage of the coated plate at 60°, 90% humidity for 2000 h hardly affected the absorption of the layer.

ED Entered STN: 17 Sep 1988

IC ICM B41M005-26

ICS G11B007-24

CC 74-12 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST **phthalocyanine** deriv optical information recording; optical information recording near IR

IT Recording materials
(optical, **phthalocyanine** derivative for, near-IR sensitive)

IT 106-54-7, p-Chlorobenzenethiol 108-98-5, Benzenethiol, reactions
110-66-7, n-Pantanethiol 112-55-0, n-Dodecanethiol
RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction of, with **halogenated phthalocyanines**, IR-sensitive agent for optical information recording for)

L113 ANSWER 28 OF 72 HCPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 1976:187272 HCPLUS Full-text
 DOCUMENT NUMBER: 84:187272
 TITLE: An Auger electron spectroscopy study of silicon spectra from silicon monoxide, silicon dioxide, and silicon nitride

AUTHOR(S): Strausser, Y. E.; Johannessen, J. S.
 CORPORATE SOURCE: Varian Assoc., Palo Alto, CA, USA
 SOURCE: NBS Special Publication (United States)
 (1976), 400-23, 125-38
 CODEN: XNBSAV; ISSN: 0083-1883

DOCUMENT TYPE: Journal
 LANGUAGE: English

AB Auger electron spectroscopy and ion sputtering were used to determine the chemical states of over grown layers on **semiconductors**, the relative amts. in each chemical state, and how this is changed by the Auger electron spectroscopy measurement itself. The samples investigated were pure Si, silicon oxides, and silicon nitride on Si(100) substrates of n-type doping ($1 < \rho < 5 \Omega$ cm). Chemical shifts were observed in SiO_x films due to the charged transfer associated with the Si-O bond, but not in silicon nitride due to a much smaller charged transfer associated with Si-N bond.

ED Entered STN: 12 May 1984
 IT 7440-21-3, properties
 RL: PRP (Properties)
 (Auger electron spectroscopy of, from silicon nitride and silicon oxides)
 RN 7440-21-3 HCPLUS
 CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 73-5 (Spectra by Absorption, Emission, Reflection, or Magnetic Resonance, and Other Optical Properties)
 Section cross-reference(s): 76

ST Auger electron spectroscopy silicon; oxide
 silicon Auger electron; nitride silicon Auger electron

IT Electron emission spectra
 (Auger, of silicon from silicon nitride and silicon oxides)

IT 7631-86-9, properties 10097-28-6 12033-89-5
 RL: PRP (Properties)
 (Auger electron spectroscopy of silicon from)

IT 7440-21-3, properties
 RL: PRP (Properties)
 (Auger electron spectroscopy of, from silicon nitride and silicon oxides)

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L113 ANSWER 29 OF 72 COMPENDEX COPYRIGHT 2007 EEI on STN
 ACCESSION NUMBER: 1995(26):2385 COMPENDEX Full-text
 TITLE: Electrical properties of the iodine doped MPC/n-silicon heterojunction.
 AUTHOR: Park, C. (GoldStar Cent Research Lab, Seoul, S Korea); Park, Y.W.
 MEETING TITLE: Proceedings of the International Conference on Science and Technology of Synthetic Metals (ICSM'94). Part III.
 MEETING LOCATION: Seoul, South Korea
 MEETING DATE: 24 Jul 1994-29 Jul 1994
 SOURCE: Synthetic Metals v 71 n 1-3 pt 3 Apr 1 1995.p 2295-2296
 SOURCE: Synthetic Metals v 71 n 1-3 pt 3 Apr 1 1995.p 2295-2296
 CODEN: SYMEDZ ISSN: 0379-6779
 PUBLICATION YEAR: 1995
 MEETING NUMBER: 42833
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Experimental
 LANGUAGE: English
 AB The current-voltage and capacitance-voltage characteristics of the iodine doped MPC on n-Si were measured. MPC was thermally evaporated on Si substrates and doped with iodine via gas phase doping. For I-V measurements, the conventional rectifying properties were shown. Using the one sided abrupt junction model C-V measurements, we can obtain the density of states at the heterointerface around 1013/cm³. (Author abstract) 4 Refs.
 AN 1995(26):2385 COMPENDEX Full-text
 CC 714.2 Semiconductor Devices and Integrated Circuits; 701.1 Electricity: Basic Concepts and Phenomena; 804.1 Organic Components; 712.1.1 Single Element Semiconducting Materials; 802.3 Chemical Operations; 942.2 Electric Variables Measurements
 CT *Heterojunctions; Electronic density of states; Semiconducting silicon; Doping (additives); Evaporation; Electric current measurement; Voltage measurement; Capacitance measurement; Current voltage characteristics; Organometallics
 ST Mettalophthalocyanine; Thermal evaporation; Ideality factor; Polymorph
 ET Si; I*V; I-V; C*V; C-V

L113 ANSWER 30 OF 72 INSPEC (C) 2007 IET on STN
 ACCESSION NUMBER: 2005:8644323 INSPEC Full-text
 TITLE: Self-assembly films of tetrakis(hydroxyphenyl) porphyrins

AUTHOR: Hong Zhang; Ye Ma; Zuhong Lu; Zhong-Ze Gu (Key Lab. of Molecular & Biomolecular Electron., Southeast Univ., Nanjing, China)

SOURCE: Colloids and Surfaces A (Physicochemical and Engineering Aspects) (5 May 2005), vol.257-258, p. 291-4, 13 refs.
CODEN: CPEAEH, ISSN: 0927-7757
SICI: 0927-7757(20050505)257/258L.291:SAFT;1-T
Doc.No.: S0927-7757(04)00791-5
Published by: Elsevier, Netherlands

DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
COUNTRY: Netherlands
LANGUAGE: English
ED 20060126

AB The self-assembly of hydroxyphenyl substituted porphyrins on silicon wafer and mica has been studied with atomic force microscope (AFM). It was found that the shape of the aggregates formed by the porphyrin derivates is affected by both the molecular structures and substrate. Tetrakis(p- hydroxyphenyl) porphyrins form disk -like morphology on the mica and the silicon wafer. Tetrakis(m-hydroxyphenyl) porphyrins form porphyrin rings on the silicon wafer through the self- assembly, while form disorganized morphology on the surface of mica. The shapes of the aggregates formed by tetrakis(o-hydroxyphenyl) porphyrins on the mica are unstable and vary with the assembly condition, while it is a random network on the silicon wafer. The mechanism for the shape formation of the hydroxyphenyl -substituted porphyrins during the self- assembly process is discussed. [All rights reserved Elsevier]

AN 2005:8644323 INSPEC Full-text
 CC A6820 Solid surface structure; A6855 Thin film growth, structure, and epitaxy; A6817 Monolayers and Langmuir-Blodgett films
 CT aggregates (materials); atomic force microscopy; elemental semiconductors; mica; molecular configurations; organic compounds; self-assembly; silicon; substrates; surface morphology; thin films
 ST self-assembly films; tetrakis(hydroxyphenyl) porphyrins; atomic force microscope; hydroxyphenyl substituted porphyrins; aggregates; molecular structures; shape formation; Si; Al2O3-K2O-SiO2
 CHI Si sur, Si el; Al2O3K2OSiO2 sur, Al2O3 sur, SiO2 sur, Al2 sur, Al sur, K2 sur, O2 sur, O3 sur, Si sur, K sur, O sur, Al2O3K2OSiO2 ss, Al2O3 ss, SiO2 ss, Al2 ss, Al ss, K2 ss, O2 ss, O3 ss, Si ss, K ss, O ss
 ET K*O*Si; K sy 3; sy 3; O sy 3; Si sy 3; K2O; K cp; cp; O cp; SiO2; Si cp; O3-K2O-SiO2; Si; O3K2OSiO; Al*O; Al2O; Al cp; O*Si; SiO; Al; K; O; Al*K*O*Si; Al sy 4; sy 4; K sy 4; O sy 4; Si sy 4; Al2O3K2OSiO

L113 ANSWER 31 OF 72 INSPEC (C) 2007 IET on STN
 ACCESSION NUMBER: 2005:8225965 INSPEC Full-text
 DOCUMENT NUMBER: A2005-03-7125T-011
 TITLE: Thickness dependence of the LUMO position for phthalocyanines on hydrogen passivated silicon (111)
 AUTHOR: Gorgoi, M.; (Inst. fur Phys., Technische Univ. Chemnitz, Germany), Michaelis, W.; Kampen, T.U.; Schlettwein, D.; Zahn, D.R.T.
 SOURCE: Applied Surface Science (15 July 2004), vol.234, no.1-4, p. 138-43, 41 refs.
CODEN: ASUSEE, ISSN: 0169-4332
SICI: 0169-4332(20040715)234:1/4L.138:TDLP;1-E
Price: 0169-4332/2004/\$30.00
Published by: Elsevier, Netherlands
Conference: Ninth International Conference on the Formation of Semiconductor Interfaces, ICFSI-9, Madrid, Spain, 15-19 Sept. 2003
Conference; Conference Article; Journal

DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental
COUNTRY: Netherlands

LANGUAGE: English
 ED 20050422
 AB Inverse photoemission spectroscopy (IPES) was employed to study the density of unoccupied electronic states of fluorinated and non-fluorinated copper phthalocyanine layers deposited onto hydrogen passivated Si(111) substrates. For the non-fluorinated copper phthalocyanine (CuPc) the lowest unoccupied molecular orbital (LUMO) was found to shift gradually towards the Fermi level with increasing film thickness. The shift amounts to 400 meV and appears for film thicknesses between one monolayer and 10 nm. This finding complements previous results obtained using ultraviolet photoemission spectroscopy where the highest occupied molecular orbital (HOMO) was found to shift as a function of film thickness. Fluorinated copper phthalocyanine (F16CuPc) shows the opposite behaviour, that is the distance between LUMO and Fermi level is increasing by 1.2 eV
 AN 2005:8225965 INSPEC DN A2005-03-7125T-011 Full-text
 CC A7125T Electronic structure of crystalline semiconductor compounds and insulators; A7320A Surface states, band structure, electron density of states; A7960E Photoelectron spectra of semiconductors and insulators; A7870 Other interactions of condensed matter with particles and radiation; A6817 Monolayers and Langmuir-Blodgett films; A6855 Thin film growth, structure, and epitaxy
 CT copper compounds; electronic density of states; Fermi level; interface states; inverse photoemission spectra; monolayers; organic semiconductors; semiconductor thin films; ultraviolet photoelectron spectra
 ST film thickness dependence; LUMO position; hydrogen passivated silicon; inverse photoemission spectroscopy; IPES; unoccupied electronic states; nonfluorinated copper phthalocyanine layers; lowest unoccupied molecular orbital; Fermi level; monolayer; ultraviolet photoemission spectroscopy; highest occupied molecular orbital method; hydrogen passivated Si(111) substrate; 10 nm; Si
 CHI Si sur, Si el
 PHP size 1.0E-08 m
 ET Si; F; V

L113 ANSWER 32 OF 72 INSPEC (C) 2007 IET on STN
 ACCESSION NUMBER: 2003:7742081 INSPEC Full-text
 DOCUMENT NUMBER: A2003-21-7960-016
 TITLE: XPS study on the FCuPc and SiO₂ interface
 AUTHOR: Lozzi, L.; Santucci, S. (Dept. of Phys., Univ. of L'Aquila, Italy)
 SOURCE: 7th International Conference on Nanometer-Scale Science and Technology and 21st European Conference on Surface Science, 2002, p. 2 pp. of CD-ROM pp., 4 refs.
 Published by: Lund Univ, Lund, Sweden
 Conference: Proceedings of 7th International Conference on Nanometer-Scale Science and Technology and 21st European Conference on Surface Science (NANO-7/ECOSS-21), Malmo, Sweden, 24-28 June 2002

DOCUMENT TYPE: Conference; Conference Article

TREATMENT CODE: Experimental

COUNTRY: Sweden

LANGUAGE: English

ED 20050421

AB We have studied the interaction between Hexadefluoro-Copper- Phthalocyanine (FCuPc) molecules and the SiO₂ interface by means of XPS and UPS spectroscopies. The measurements have been done at different electron emission angles in order to enhance the surface sensitivity. Different amounts of FCuPc have been deposited by UHV thermal evaporation on clean SiO₂ surface. When a sub-monolayer molecular film is deposited the bond between fluorine atoms and silicon ones is observed, determining the presence of a very thin clean silicon layer at the sample surface. These new bonds induce a strong variation of the molecular electronic structure, in particular in the outer

part of the molecule, with respect to the bulk phase. Instead the central part of the molecule shows an electronic configuration very similar to the bulk one

AN 2003:7742081 INSPEC DN A2003-21-7960-016 [Full-text](#)

CC A7960G Photoelectron spectra of composite surfaces; A8280P
Electron spectroscopy for chemical analysis (photoelectron, Auger spectroscopy, etc.); A8115G Vacuum deposition; A6855 Thin film growth, structure, and epitaxy; A6817 Monolayers and Langmuir-Blodgett films; A7145N Calculations of total electronic binding energy; A7125V Electronic structure of organic compounds and polymers

CT band structure; binding energy; bonds (chemical); electron emission; monolayers; organic semiconductors; sensitivity; silicon compounds; thin films; ultraviolet photoelectron spectra; vacuum deposition; X-ray photoelectron spectra

ST XPS; SiO₂ interface; hexadefluoro copper phthalocyanine molecules; UPS spectroscopy; electron emission angles; surface sensitivity; UHV thermal evaporation; monolayer molecular film; chemical bond; fluorine atoms; silicon; molecular electronic structure; electronic configuration; binding energy; thin films; SiO₂

CHI SiO₂ int, O₂ int, Si int, O int, SiO₂ bin, O₂ bin, Si bin, O bin

ET O₂; O; Si; O*Si; SiO; Si cp; cp; O cp; Cu*F; FCu; F cp; Cu cp; SiO₂

L113 ANSWER 33 OF 72 INSPEC (C) 2007 IET on STN
ACCESSION NUMBER: 1995:5003675 INSPEC [Full-text](#)
DOCUMENT NUMBER: A1995-16-7340N-008; B1995-09-2530D-010
TITLE: Electrical properties of the iodine doped MPC/n-silicon heterojunction
AUTHOR: Park, C.; (GoldStar Central Res. Lab., Seoul, South Korea), Park, Y.W.
SOURCE: Synthetic Metals (1 April 1995), vol.71, no.1-3, p. 2295-6, 4 refs.
CODEN: SYMEDZ, ISSN: 0379-6779
Price: 0379-6779/95/\$9.50
Conference: International Conference on Science and Technology of Synthetic Metals (ICSM '94), Seoul, South Korea, 24-29 July 1994
Sponsor(s): Samsung Group; Korea Sci. & Eng.
Found
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Experimental
COUNTRY: Switzerland
LANGUAGE: English
ED 20050414
AB The current-voltage and capacitance-voltage characteristics of the iodine doped MPC on n-Si were measured. MPC was thermally evaporated on Si substrates and doped with iodine via gas phase doping . For I-V measurements, the conventional rectifying properties were shown. Using the one sided abrupt junction model in C-V measurements, we can obtain the density of states at the heterointerface around 10¹³/cm³

AN 1995:5003675 INSPEC DN A1995-16-7340N-008; [Full-text](#)
B1995-09-2530D-010

CC A7340N Electrical properties of metal-nonmetal contacts; A7340E Rectification at interfaces; A7320A Surface states, band structure, electron density of states; B2530D Semiconductor-metal interfaces; B2520C Elemental semiconductors

CT cobalt compounds; electronic density of states; elemental semiconductors; interface states; iodine; nickel compounds; rectification; semiconductor-metal boundaries; silicon

ST electrical properties; I doped Co phthalocyanine/n-Si heterojunction; current-voltage characteristics; capacitance-voltage characteristics; thermally evaporated layer; gas phase doping; Si substrates; I-V measurements; rectifying

properties; one sided abrupt junction model; C-V measurements; density of states; heterointerface; I doped Ni phthalocyanine/n-Si heterojunction; Si

CHI Si int, Si el

ET Co; Si; V; Ni; I*V; I-V; C*V; C-V

L113 ANSWER 34 OF 72 DISSABS COPYRIGHT (C) 2007 ProQuest Information and Learning Company; All Rights Reserved on STN

ACCESSION NUMBER: 91:32709 DISSABS Order Number: AAR9213507

TITLE: OPTICAL CHARACTERIZATION OF LOW-DIMENSIONAL SYNTHETIC CONDUCTORS. (VOLUMES I AND II) (SYNTHETIC CONDUCTORS)

AUTHOR: MCCARTHY, WILLIAM J. [PH.D.]; KANNEWURF, CARL R. [advisor]

CORPORATE SOURCE: NORTHWESTERN UNIVERSITY (0163)

SOURCE: Dissertation Abstracts International, (1991) Vol. 52, No. 12B, p. 6467. Order No.: AAR9213507. 516 pages.

DOCUMENT TYPE: Dissertation

FILE SEGMENT: DAI

LANGUAGE: English

ENTRY DATE: Entered STN: 19921118

Last Updated on STN: 19921118

ED Entered STN: 19921118

Last Updated on STN: 19921118

AB The optical reflectance studies of anisotropic synthetic conductors were analyzed with the Drude-Lorentz dielectric response model. The reflectivity of some single crystal materials shows significant anisotropy with regard to optical parameters. The polycrystalline reflectance spectra were analyzed by the following procedures: a reflectance average method, the Maxwell-Garnett effective medium theory and the Bruggeman effective medium approximation.

The reflectance average method assumes that the polycrystalline reflectivity is an average of the polarized reflectivity from the principal crystallographic axes. The effective medium theories assume that the polycrystalline reflectivity is determined by an effective dielectric response model. The polycrystalline reflectivity was compared to single crystal reflectivity, when available. For the synthetic conductors discussed in this investigation, the reflectance average method gave the best overall agreement with the experimental results. The synthetic conductors examined were **phthalocyanine**-based molecular metals and polymers, tetraselenatetracene molecular metals, rare earth copper oxide superconductors, and the intercalated tantalum dichalcogenide system. A short summary of significant results can be stated as follows: The optical reflectivity of H\$\\sb2\$(Pc)I revealed the first complete Drude edge of a single crystal **phthalocyanine** molecular metal. Counterions were introduced into the **silicon phthalocyanine** polymer \$\\{\\\$Si(Pc)O \$(X\$\\sb{\\rm y})\$\\}\\\$ to achieve a wide range of charge transfer. The optical reflectivity of compounds with charge transfer ratios below 0.2 were found to be **semiconductors**. As the charge transfer ratio increases for the metallic compositions, the plasma frequency increases as predicted by the tight-binding band model. Tetraselenatetracene compounds were created with halogen and perchlorate counterions. The single crystal reflectance study of a partially **fluorine doped** TSeT metal revealed one of the highest plasma frequencies reported for a one-dimensional molecular metal. Analysis of the layered Y-Ba-Cu-O and Eu-Ba-Cu-O superconductors and intercalated tantalum disulfides revealed interesting optical behavior in the normal state at infrared frequencies. This work has shown that the optical diagnostics of anisotropic low-dimensional synthetic conductors can provide key information that identifies unusual transport behavior.

CC 0752 PHYSICS, OPTICS; 0544 ENGINEERING, ELECTRONICS AND ELECTRICAL; 0495 CHEMISTRY, POLYMER

=> d 1113 35-72 iall abeq tech abex

L113 ANSWER 35 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2006-502835 [51] WPIX

DOC. NO. CPI: C2006-157253 [51]

TITLE: Combination useful in coating of implantable

medical device e.g. stent comprises signal generating agent, material for manufacture of implantable medical device or its component and therapeutically active agent

DERWENT CLASS: A96; B07; D22; P32
 INVENTOR: ASGARI S
 PATENT ASSIGNEE: (BLUE-N) BLUE MEMBRANES GMBH; (ASGA-I) ASGARI S
 COUNTRY COUNT: 111

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|--------|----------|
| WO 2006069677 | A2 | 20060706 | (200651)* | EN | 105[1] | |
| US 20060177379 | A1 | 20060810 | (200654) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|----------------|-----------------|----------|
| WO 2006069677 | A2 | WO 2005-EP13732 | 20051220 |
| US 20060177379 | A1 Provisional | US 2004-640794P | 20041230 |
| US 20060177379 | A1 | US 2005-322694 | 20051230 |

PRIORITY APPLN. INFO: US 2004-640794P 20041230
 US 2005-322694 20051230

INT. PATENT CLASSIF.:

IPC ORIGINAL: A61K [,S]; A61F0002-06 [I,A]; A61K0049-04 [I,A];
 A61K0049-06 [I,C]; A61K0049-10 [I,A]

BASIC ABSTRACT:

WO 2006069677 A2 UPAB: 20060809

NOVELTY - A combination comprises signal generating agent (a1), which in a physical, chemical and/or biological measurement or verification method leads to detectable signals, material (m1) for manufacture of an implantable medical device and/or at least one component of an implantable medical device, and therapeutically active agent (b1), which in an animal or human organism fulfills directly or indirectly a therapeutic function.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for the determination of the extent of the release of an active agent from a completely or partially degradable or non-degradable implantable medical device, or component of the device, where the device at least partially releases (b1) together with (a1)/(a2) upon degradation after insertion into a human or animal organism, involving detecting (a1)/(a2) with the use of non-invasive imaging methods.

USE - In a coating of an implantable medical device or component of an implantable medical device e.g. stent (claimed).

ADVANTAGE - The medical implants are detectable for diagnostic and therapeutic purposes during or after their application by image generating methods; are completely or partially biodegradable or bio-erodible; have controllable rate of degradation over the residence time; and permits a correlation between implant effectiveness and therapeutic result over the acquisition of implantation/tissue limits and new tissue growth. MANUAL CODE: CPI: A12-V02; A12-V03; B04-B04K; B04-C02;

B04-C03; B04-E02; B04-E08; B04-F01; B04-F1100E;
 B04-H19; B04-N02; B04-N04; B04-N06; B05-A01B;
 B05-A03A4; B05-C03; B05-C08; B05-U01; B05-U02;
 B10-B02A; B10-C04C; B10-D03; B10-H02B; B10-H02F;
 B11-C04A1; B11-C07B; B11-C08J; B11-C11; B12-K04C;
 D09-C; D09-C01

TECH

INORGANIC CHEMISTRY - Preferred Agents: (a1) in addition to its signal-generating function has at least a second function; possesses signal-generating properties without a physical or chemical or biological stimulus or a physiologically conditioned in vivo change; and gains its signal-generating properties through a physical, chemical or biological stimulus or through a physical, chemical or biological or, physiologically conditioned change in vivo. The second function or other functions comprises that of at least one therapeutically active agent and/or targeting group.

(a1) comprises first and second unit, which are optionally covalently bonded to each other, where the first unit has a signal-generating function and the second unit or further units have other functions. (a1) and (a2) lead directly or indirectly to detectable signals in a physical, chemical and/or biological measurement or verification method, where the first agent in a method, in which the second agent leads to detectable signals is essentially not detectable. (a1)/(a2) leads to detectable signals in the methods such as conventional X-ray methods, X-ray-based split-image methods like computer tomography, neutron transmission tomography, radio frequent magnetization like magnetic resonance tomography, further methods based on radio nuclides like scintigraphy, single photon emission computed tomography (SPECT), positron emission computed tomography (PET), ultrasonic-based methods or fluoroscopic methods or luminescence or fluorescence-based methods, for e.g. intravasal fluorescence spectroscopy, Raman spectroscopy, fluorescence emission spectroscopy, electrical impedance spectroscopy, colorimetry, optical coherence tomography, or electron spin resonance (ESR), radiofrequency (RF) und microwave laser. (a1)/(a2) are selected from metals, metal oxides, metal carbides, metal nitrides, metal oxynitrides, metal carbonitrides, metal oxycarbides, metal oxynitrides, metal oxycarbonitrides, metal hydrides, metal alkoxides, metal halides, inorganic or organic metal salts, for e.g. salts and chelates from the lanthanide group with atomic numbers 57-83 or the transition metals with atomic numbers 21-29, 42 or 44, as well as metal polymers, metallocenes, and other organometallic compounds, for e.g. metal complexes with phthalocyanines (preferably magnetic and/or semi conducting materials or compounds, for example with paramagnetic, diamagnetic, super paramagnetic, ferrimagnetic or ferromagnetic properties and/or semiconductors from the Groups II- VI, Groups III- V, or the Group IV with absorption properties for radiation in the wavelength ranges from gamma rays up to microwave radiation and/or the property of emitting radiation, especially ionic and non-ionic halogenated agents such as 3-acetyl amino-2,4-6-triiodobenzoic acid, 3,5-diacetamido-2,4,6-triiodobenzoic acid, 2,4,6-triiodo-3,5-dipropionamidobenzoic acid, 3-acetyl amino-5 -((acetyl amino)methyl)-2,4,6-triiodobenzoic acid, 3-acetyl amino-5-(acetylmethylamino)-2,4,6-triiodobenzoic acid, 5-acetamido-2,4,6-triido-N-((methylcarbamoyl)methyl)isophthalamic acid, 5-(2-methoxyacetamido)-2,4,6-triido-N-(2-hydroxy-1-(methylcarbamoyl)-ethyl)-isophthalamic acid, 5-acetamido-2,4,6-triido-N-methylisophthalamic acid, 5-acetamido-2,4,6-triido-N-(2-hydroxyethyl)isophthalamic acid, 2-((2,4,6-triido-3-((1-oxobutyl)amino)phenyl)methyl)butanoic acid, beta-(3-amino-2,4,6-triiodophenyl)-alpha-ethylpropionic acid, iopamidol, iotrolan, iodexamol, iodixanol, ioglucol, ioglucomide, iogulamide, iomeprol or iopentol; carbon species, such as carbides, fullerenes, especially fullerene-metal complexes, endohedral fullerenes, which contain rare earths like cerium, neodymium, samarium, europium, gadolinium, terbium, dysprosium or holmium, or halogenated fullerenes; anionic and/or cationic lipids such as halogenated anionic or cationic lipids; gases or in vivo gas-forming substances such as air, nitrogen, hydrogen, or alkanes or halogenated hydrocarbon gases such as methyl chloride, perfluoroacetone or perfluorobutane, optionally included in microbubbles or microspheres; and recombinant or non-recombinant nucleic acids, proteins, peptides or polypeptides, which directly or indirectly induce the in-vivo formation or enrichment of signal-generating agents, such as nucleic acids, which contain coding sequences for the expression of signal-generating agents, such as for example metallo-protein complexes (preferably dicarboxylate proteins, lactoferrin or ferritin), or which regulate enrichment and/or homeostasis of

physiologically available signal-generating agents, such as the iron regulatory protein (IRP), transferrin receptor and erythroid 5-aminolevulinate synthase). (a1)/(a2) are provided in the form of polymeric and/or non-polymeric nano or micro particles, preferably in an average size of 2 nm - 20 microns (preferred 2 nm - 5 microns); provided in the form of microspheres, macrospheres, micelles or liposomes, or are encapsulated in polymeric shells; provided in the form of biological vectors such as transfection vectors such as virus particles or viruses, preferably adeno viruses, adeno virus associated viruses, herpes simplex viruses, retroviruses, alpha viruses, pox viruses, arena-viruses, vaccinia viruses, influenza viruses or polio viruses; are in the form of signal-generating agents or vectors containing cells, cell cultures, organized cell cultures, tissues, organs of any desired species, and non-human organisms which contain recombinant nucleic acids with coding sequences for signal-generating agents; and provided in the form of solutions, suspensions, emulsions or dispersions and/or solid materials. (a1) is optionally bonded covalently to (a2).

Preferred Material: (m1) comprises several non-polymeric materials, selected from ceramic, glass, metals, alloys, bone, stone and/or mineral (preferably magnesium, zinc and/or their alloy).

PHARMACEUTICALS - Preferred Agent: (b1) can be directly or indirectly released in an animal or human organism from the implantable medical device or a component of the implantable medical device.

Preferred Combination: The combination comprises a second signal-generating agent (a2) detectable with a measurement or verification method, with which (a1) is essentially not detectable; adjuvant (preferably polymeric, nonpolymeric, inorganic, organic and/or inorganic-organic composite). The implantable medical device comprises at least a region which shows a concentration gradient in the local distribution of the at least one signal-generating agent; and first and second coating layer, where the concentration of the at least one signal-generating agent in the first layer differs from the concentration in the second coating layer. The adjuvant(s) are biodegradable, non-degradable and/or partially biodegradable; are retarding agent(s), which allows to control the release of the at least one (b1) and/or (a1) when the device is exposed to physiologic fluids and/or has been implanted into human or animal organism. (a1)/(a2) are in a porous reticulated network which can be loaded with (b1).

POLYMERS - Preferred Material: (m1) comprises biologically degradable materials and/or biologically non-degradable materials. The device or its component is formed from (m1), which in at least one of the image forming methods applied in medical technology is not representable. (m1) comprises several polymers, such as polyurethane, collagen, albumin, gelatin, hyaluronic acid, starch, cellulose (methylcellulose, **hydroxypropylcellulose**, **hydroxypropylmethylcellulose**, carboxymethylcellulosephthalate, casein, dextrane, polysaccharide, fibrinogen, poly(D,L-lactide), poly(D,L-lactide-co-glycolide), poly(glycolide), poly(**hydroxybutyrate**), poly(alkyl carbonates), poly(orthoester), polyesters, poly(**hydroxyvaleric** acid), polydioxanone, poly(ethylene terephthalate), poly(malic acid), poly(tartronic acid), polyanhydride, polyphosphohazene and/or poly(amino acid).

L113 ANSWER 36 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2006-344341 [35] WPIX

DOC. NO. CPI: C2006-113076 [35]

DOC. NO. NON-CPI: N2006-291797 [35]

TITLE: New substituted anthracene compounds useful in electronic devices such as organic thin-film transistor (OTFT) and organic light emitting diode (OLED)

DERWENT CLASS: A85; E12; E13; L03; P85; U11; U12
 INVENTOR: MENG H
 PATENT ASSIGNEE: (DUPO-C) DU PONT DE NEMOURS & CO E I; (MENG-I)
 MENG H
 COUNTRY COUNT: 111

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| WO 2006050496 | A1 | 20060511 | (200635)* | EN | 64[4] | |
| US 20060131570 | A1 | 20060622 | (200642) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-----------------------|--|-----------------|----------|
| WO 2006050496 | A1 | WO 2005-US39947 | 20051102 |
| US 20060131570 | A1 Provisional | US 2004-624555P | 20041102 |
| US 20060131570 | A1 | US 2005-265696 | 20051102 |
| PRIORITY APPLN. INFO: | US 2004-624555P | 20041102 | |
| | US 2005-265696 | 20051102 | |
| INT. PATENT CLASSIF.: | | | |
| IPC ORIGINAL: | C07D0333-00 [I,C]; C07D0333-00 [I,C]; C07D0333-08 [I,A]; C07D0333-54 [I,A]; C07F0007-00 [I,C]; C07F0007-08 [I,A]; G09G0003-32 [I,A]; H01L0051-00 [I,A]; H01L0029-02 [I,C]; H01L0029-08 [I,A] | | |

BASIC ABSTRACT:

WO 2006050496 A1 UPAB: 20060602

NOVELTY - Substituted anthracene compounds (I) are new.

DETAILED DESCRIPTION - Substituted anthracene compounds of formula (I) are new.

X = O, S, Te, Se or NR;

R1-R18 = alkyl, (hetero)aryl, aryloxy, alkoxy, alkenyl, alkynyl, amino, alkylthio, phosphino, silyl (all optionally substituted), H, halo, OH, COR, COOR, PO3R2, -OPO3R2, CN, -CnF2n+1 or CnF2n+1CmH2m+1 (any two adjacent groups of R1-R18 can be taken together to form a ring);

R = alkyl, (hetero)aryl, alkenyl, alkynyl, NH2 (all optionally substituted) or H; and

m, n = 0-10.

Provided that if X is S, then at least one of R2-R8 or R11-R17 is not H.

INDEPENDENT CLAIMS are also included for:

(1) an organic thin-film transistor (OTFT) comprising a **substrate**, an insulating layer, a gate electrode, a source electrode, a drain electrode and an organic **semiconductor** layer comprising (I), where the insulating layer, gate electrode, **semiconductor** layer, source electrode and the drain electrode are arranged in any sequence, provided that the gate electrode and the **semiconductor** layer both contact the insulating layer, source electrode and the drain electrode both contact the **semiconductor** layer and the electrodes are separated from each other; and

(2) an organic light emitting diode (OLED) comprising a **substrate**, an anode, a layer comprising (I) and a cathode.

USE - (I) are useful in electronic devices such as organic thin-film transistor (OTFT) and organic light emitting diode (OLED) (claimed).

ADVANTAGE - (I) are highly stable compounds that can be incorporated into thin-film transistor (TFT) at low **substrate** temperatures and do not need to be handled in an inert atmosphere during the fabrication of TFT. The devices possess desirable **semiconductor** properties e.g. high mobility and a high current on/off ratio. MANUAL CODE: CPI:

A10-E03; A10-E20; A10-E22A; A10-E23;

A12-E07C; A12-E11A; E24-A06B; E31-G; E31-P03;
 E31-P06D; E34-C02; E35; L03-G05F1; L04-E01E;
 L04-E03A; N05-C

EPI: U11-A01F; U12-A01A1E; U12-B03A; U12-B03C

TECH

ELECTRONICS - Preferred Components: The gate electrode comprises a material selected from **doped silicon**, aluminum, gold, chromium, indium tin oxide, polystyrene sulfonate-**doped** poly(3,4-ethylenedioxythiophene), carbon black or

graphite dispersed in a polymer binder or a colloidal silver dispersion in a polymer binder. The source and drain electrodes comprise a material selected from aluminum, barium, calcium, chromium, gold, silver, nickel, palladium, platinum, titanium or their alloys; carbon nanotubes; polyaniline; poly(3,4-ethylenedioxythiophene)/poly-(styrene sulfonate); dispersions of carbon nanotubes in conducting polymers; dispersions of a metal in a conducting polymer; and their multilayers. The insulating layer comprises a material selected from aluminum oxides, silicon oxides, tantalum oxides, titanium oxides, silicon nitrides, barium titanate, barium strontium titanate, barium zirconate titanate, zinc selenide, zinc sulfide, and alloys, combinations or their multilayers; polyesters, polycarbonates, poly(vinyl phenol), polyimides, polystyrene, poly(methacrylate)s, poly(acrylate)s, epoxy resins or their blends or multilayers.

The anode comprises a material selected from metals in group 4, 5, 6, 8-11; mixed metals; alloys; metal oxides; mixed-metal oxides of metals from Groups 12-14; or conducting polymers (preferably aluminum; gold; chromium; indium tin oxide; polyaniline; polystyrene sulfonate-doped poly(3,4-ethylenedioxythiophene); carbon black or graphite dispersed in a polymer binder; or a colloidal silver dispersion in a polymer binder). The cathode comprises a material selected from metals of group 1, 2 or 12 metals (preferably aluminum, indium, calcium, barium, samarium and/or magnesium).

The OLED further comprises: a hole-transport layer in contact with the anode and the layer comprising a (I); an electron-transport layer in contact with the cathode and the layer comprising (I); a hole-injection layer in contact with the anode and the hole-transport layer; and an electron-injection layer in contact with the cathode and the electron-transport layer. The hole-transport layer comprises a material selected from N,N'-diphenyl-N,N'-bis(3-methylphenyl)-(1,1'-biphenyl)4,4'-diamine; 1,1-bis((di-4-tolylamino)phenyl)cyclohexane; N,N'-bis(4-methylphenyl)-N,N'-bis(4-ethylphenyl)-(1,1'-(3,3'-dimethyl)biphenyl)-4,4'-diamine; tetrakis-(3-methylphenyl)-N,N,N',N'-2,5-phenylenediamine; alpha-phenyl-4-N,N-diphenylaminostyrene; p-(diethylamino)benzaldehyde diphenylhydrazone; triphenylamine; bis(4-(N,N-diethylamino)-2-methylphenyl)(4-methylphenyl)methane; 1-phenyl-3-(p-diethylamino)styryl)-5-(p-(diethylamino)phenyl) pyrazoline; 1,2-trans-bis(9H-carbazol-9-yl)cyclobutane; N,N,N',N'-tetrakis(4-methylphenyl)-(1,1'-biphenyl)-4,4'-diamine; copper phthalocyanine; polyvinylcarbazole; (phenylmethyl)polysilane; or polyaniline. The electron-transport layer comprises a material selected from tris(8-hydroxyquinolato)aluminum; 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline; 4,7-diphenyl-1,10-phenanthroline; 2-(4-biphenyl)-5-(4-tert-butylphenyl)-1,3,4-oxadiazole; or 3-(4-biphenyl)-4-phenyl-5-(4-tert-butylphenyl)-1,2,4-triazole.

The OTFT comprises an organic **semiconductor** layer comprising (I) (15 anthracene compounds e.g. 2,6-dimethyl-3,-7-dithiophenyl anthracene). The OLED comprises a layer comprising (I) (6 anthracene compounds e.g. 2,6-bis-4-methyl-thiophenyl-anthracene).

ORGANIC CHEMISTRY - Preparation: Preparation of (I) comprises reaction of a 2,6-dihaloanthracene with a boron reagent in the presence of palladium catalyst to form a 2,6-disubstituted anthracene; and reaction of 2,6-disubstituted anthracene with a **halogenated** heterocycle in the presence of a palladium(0) catalyst to form (I).

Preferred Components: The substituted R and R1-R18 groups have substituent groups selected from cyanide, nitro, ester, ether, halogen, **hydroxy**, alkyl, aryl, silyl and alkoxy groups.

POLYMERS - Preferred Components: The **substrate** comprises a material selected from inorganic glasses, ceramic foils,

acrylics, epoxies, polyamides, polycarbonates, polyimides, polyketones, poly(oxy-1,4-phenyleneoxy-1,4-phenylene carbonyl-1,4-phenylene), polynorbornenes, polyphenyleneoxides, poly(ethylene naphthalenedicarboxylate), poly(ethylene terephthalate), poly(phenylene sulfide), fiber-reinforced plastics or coated metallic foils).

ABEX DEFINITIONS - Preferred Definitions: - R3-R16 = H, alkyl, alkenyl, alkynyl, aryl all optionally substituted; - R9, R10 = H; - X = S; or - R1R2, R17R18 = a ring; and - n, m = 0-1.

SPECIFIC COMPOUNDS - 21 Compounds (I) are specifically claimed e.g. 2,6-dimethyl-3,-7-dithiophenyl anthracene of formula (Ia). EXAMPLE - To a solution of diisopropylamine (21.6 ml) in anhydrous diethyl ether (200 ml) was added 2.5 M n-butyllithium in hexane (49.3 ml) at room temperature. After stirring at room temperature for 30 minutes, the resulting lithium di-isopropylamide solution (LDA) was cooled to -76degreesC. A solution of 3-butylthiophene (18 g) in ether (100 ml) was cooled to -76degreesC and added to the above LDA solution. The temperature was allowed to rise slowly to -40degreesC, whereupon it was stirred for 1 hour. The solution was then recooled to -76degreesC and trimethylborate (20.6 ml) was added slowly. The mixture was allowed to warm to room temperature and stirred for 2 hours. The reaction mixture was worked up to give 2-(4-butyl-thiophen-2-yl)-1,3,2-dioxaborinane (A). To a mixture of 2,6-dibromoanthracene (2.016 g) and (A) (4.034 g) in toluene (90 ml) was added sodium carbonate (3.18 g) dissolved in water (15 ml), followed by the addition of phase-transfer agent Aliquat (RTM) 336 (1.2 g). The mixture was bubbled with nitrogen for 15 minutes. Then, tetrakis(triphenylphosphine)palladium(0) (139 mg) was added. The mixture was heated to 90degreesC for three days under a nitrogen atmosphere. The reaction mixture was worked up to give bis-(4'-butyl-thiophen-2'yl)-2,6-anthracene (0.68 g, 25%).

L113 ANSWER 37 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2006-537847 [55] WPIX
 DOC. NO. CPI: C2006-168463 [55]
 TITLE: Manufacture of powdery silicon carbide used as abrasives, involves reacting alloy containing silicon and transition metal element with specific (un)substituted hydrocarbon at preset temperature
 DERWENT CLASS: E36; L02
 INVENTOR: INOUE K
 PATENT ASSIGNEE: (CANO-C) CANON KK
 COUNTRY COUNT: 2

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| <hr/> | | | | | | |
| US 20060171873 | A1 | 20060803 | (200655)* | EN | 14[4] | |
| JP 2006206391 | A | 20060810 | (200655) | JA | 17 | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|----------------|----------|
| <hr/> | | | |
| US 20060171873 | A1 | US 2006-336811 | 20060123 |
| JP 2006206391 | A | JP 2005-21614 | 20050128 |

PRIORITY APPLN. INFO: JP 2005-21614 20050128

INT. PATENT CLASSIF.:

IPC ORIGINAL: C01B0031-00 [I,C]; C01B0031-36 [I,A];
C04B0035-626 [I,A]

BASIC ABSTRACT:

US 20060171873 A1 UPAB: 20060825

NOVELTY - The alloy containing silicon element and transition metal element(s) is reacted with (un)substituted hydrocarbon, at 370-800degreesC, to obtain silicon carbide powder. The (un)substituted hydrocarbon is chosen from chain saturated hydrocarbon, chain unsaturated hydrocarbon, cyclic saturated hydrocarbon, alcohol, and aromatic hydrocarbon.

USE - For manufacturing silicon carbide powder used as raw material for silicon carbide single crystal wafer used in automobiles and power semiconductor. Also used as thermal and mechanical functional structure materials for crucible, ceramic baking components, abrasion-resistant sliding component, heat exchanger tube, paper component, catalyst carrier, filter, waste incinerator lining material, heating element, and abrasive for polishing super hard metal, soft metal and resin.

ADVANTAGE - The method economically provides silicon carbide powder having large surface area, small particle size and small amount of impurities, at low temperature using simple apparatus. The method does not generate toxic halogenated hydrogen.

DESCRIPTION OF DRAWINGS - The figure shows the flowchart for manufacturing silicon carbide powder. MANUAL CODE: CPI: E31-P06C; L02-A02; L02-F03; N02; N03; N07-

J
TECH

INORGANIC CHEMISTRY - Preferred Element: The transition metal element is chosen from iron, cobalt, nickel, copper, silver, tantalum, niobium, chromium, tungsten, molybdenum, titanium, ruthenium, rhodium and palladium. Preferred Process: The silicon carbide powder is also prepared using organic transition metal compound chosen from ferrocene, nickelocene, cobaltocene, iron carboxylate, nickel carboxylate, cobalt carboxylate, iron oxalate, nickel oxalate, cobalt oxalate, nickel phthalocyanine, cobalt phthalocyanine, iron phthalocyanine, nickel acetylacetone, cobalt acetylacetone, iron acetylacetone, nickel carbonyl, cobalt carbonyl and iron carbonyl. The transition metal compound comprises transition metal oxide chosen from iron oxide, nickel oxide, cobalt oxide, copper oxide, niobium oxide, chromium oxide, tungsten oxide, molybdenum oxide, titanium oxide, ruthenium oxide, rhodium oxide, and palladium oxide.

L113 ANSWER 38 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2006-401658 [41] WPIX
 DOC. NO. CPI: C2006-127671 [41]
 DOC. NO. NON-CPI: N2006-334749 [41]
 TITLE: Pattern formation method for forming organic insulation film used for organic thin film transistor, involves applying imprintable composition on electrode, pressurizing and curing formed organic insulation film, and etching
 DERWENT CLASS: A18; A26; A85; E19; L03; U11; U12; U14
 INVENTOR: LEE S Y; PARK J Y; RYU M S; SHIN J H; SON Y M
 PATENT ASSIGNEE: (SMSU-C) SAMSUNG ELECTRONICS CO LTD
 COUNTRY COUNT: 2

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| US 20060115998 | A1 | 20060601 | (200641)* | EN | 10[5] | |
| KR 2006060232 | A | 20060605 | (200674) | KO | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|----------------|----------|
| US 20060115998 | A1 | US 2005-195694 | 20050803 |
| KR 2006060232 | A | KR 2004-99161 | 20041130 |

PRIORITY APPLN. INFO: KR 2004-99161 20041130
 INT. PATENT CLASSIF.:
 IPC ORIGINAL: H01L0021-02 [I,C]; H01L0021-31 [I,A]
 BASIC ABSTRACT:

US 20060115998 A1 UPAB: 20060629

NOVELTY - An imprintable composition is coated on an electrode provided on a **substrate**, to form an organic insulation film. The organic insulation film is pressurized using a patterned mold to transfer pattern of the mold to organic ion film, and cured. A portion of organic insulation film remaining on the electrode, is etched.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

- (1) organic insulation film patterned by the method;
- (2) organic thin film transistor comprising a **substrate**, gate electrode, organic insulation film, organic **semiconductor** layer and source drain electrode; and
- (3) display device comprising the organic thin film transistor.

USE - For organic thin film transistor used for display devices (both claimed)

ADVANTAGE - An organic insulation film can be patterned using an imprintable composition by simple molding without using a photoresist. Hence, organic thin film transistor having high carrier mobility can be fabricated by simple procedure at low cost.

DESCRIPTION OF DRAWINGS - The figure shows schematic view showing the method of forming a pattern of organic insulation film on an electrode.

MANUAL CODE:

CPI: A11-B05D; A11-C02C; A11-C04C; A12-E11;
 E05-E02D; E05-L03B; E07-A03A; E08-B; E10-A01;
 E10-A04B1A; E10-E04L3; E10-F02C; E10-H04A3;
 E31-B03C; E31-D02; E31-E01; E31-F05; E31-H05;
 E31-K05A; E31-P06B; E33-A03; L03-G05B6;
 L03-G05F2; L04-A04; L04-C12E; L04-E01E
 EPI: U11-C04J; U11-C18A1; U12-B03A; U14-J02E

TECH

INORGANIC CHEMISTRY - Preferred Composition: The imprintable composition comprises at least one compound having a functional group selected from group of formulae (1-9), $-O-C(O)-C(CH_2)-R$, $-O-CH=CH_2$, or $-O-C(O)-O-CH=CH_2$.

R=H or methyl.

The composition is prepared by mixing at least one compound having a functional group, a linear polymer and an initiator. Preferred Method: The method further involves polishing or **surface** treating the organic insulation film after etching. The composition is dissolved in a solvent selected from toluene, 1-methyl-2-pyrrolidone, acetone, cyclohexanone, tetrahydrofuran, ethyl acetate, propylene glycol methyl ether acetate, isopropyl alcohol, butyl alcohol and perfluoro ethane, and coated to a thickness of 2000-20000Angstrom, and soft baked at 80-150degreesC for 10 seconds to 30 minutes. The insulation film is pressurized under a pressure of 0.2-3 kg/cm² for 2-20 minutes and cured by exposing the film to UV light at 2-20 J/cm² or baking the film at 100-300degreesC for 0.5-30 minutes to solidify it. The etching is carrying out by wet etching using etching solution selected from acetone, isopropyl alcohol, hydrofluoric acid, nitric acid, phosphoric acid, hydrogen peroxide and potassium hydroxide. Dry etching is carried out using etching gas selected from sulfur hexafluoride, hydrofluoric acid, tetrafluoromethane, silane and oxygen. Post treatment is carried out by chemically or physically polishing the **surface** of organic insulation film using a slurry or powder aqueous solution, or forming a **self assembled monolayer** on the **surface** of organic insulation film using **self assembled** single molecule selected from octadecyl trichlorosilane and 3-aminopropyl triethoxy silane.

Preferred Transistor: The organic **semiconductor** layer is made of material selected from pentacenes, copper phthalocyanine, polythiophene, polyaniline, polyacetylene, polypyrrole, polyphenylene vinylene and derivatives.

INORGANIC CHEMISTRY - Preferred Electrodes: The gate electrode and the source/drain electrodes are made of gold, silver, aluminum, nickel, molybdenum, tungsten, indium tin oxide, polythiophene, polyaniline, polyacetylene, polypyrrole, polyphenylene vinylene, and polyethylene dioxythiophene/polystyrene sulfonate mixtures.

Preferred Substrate: The **substrate** is made of glass, silicon, and plastic.

ABEX EXAMPLE - Trimethylol propane triglycidyl ether (in g) (2),

triphenyl sulfonium triflate (0.02), benzoyl peroxide (0.02) and polyvinyl phenol (2) of weight-average molecular weight 8000 were dissolved in cyclohexanone. A composition for forming an organic insulation film, is obtained. The composition was spin coated on glass **substrate** to form an organic insulation film of thickness 8000Angstrom, and soft baked at 100degreesC for 30 seconds. The film was pressurized at 1 kg/cm² for 10 minutes and irradiated with UV light to cure the film. A pattern of organic insulation film is formed.

L113 ANSWER 39 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2006-249902 [26] WPIX
 DOC. NO. CPI: C2006-081512 [26]
 DOC. NO. NON-CPI: N2006-214090 [26]
 TITLE: Thin-film transistor for flat panel display device, comprises gate insulator having thicker portion between gate electrode and each of source and drain electrodes, and thinner portion between gate electrode and channel region
 DERWENT CLASS: A85; E13; L03; U11; U12; U14
 INVENTOR: KOO J; LEE H; KOO J B; LEE H J
 PATENT ASSIGNEE: (KOOJ-I) KOO J; (LEEH-I) LEE H; (SMSU-C) SAMSUNG DENKAN KK; (SMSU-C) SAMSUNG SDI CO LTD
 COUNTRY COUNT: 4

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|------------|
| US 20060060855 | A1 | 20060323 | (200626)* | EN | 11[3] | |
| JP 2006093652 | A | 20060406 | (200626) | JA | 14 | |
| CN 1753202 | A | 20060329 | (200649) | ZH | | H01L051-05 |
| KR 2006026244 | A | 20060323 | (200662) | KO | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|------------------|----------|
| US 20060060855 | A1 | US 2005-230293 | 20050919 |
| JP 2006093652 | A | JP 2005-154659 | 20050526 |
| CN 1753202 | A | CN 2005-10104810 | 20050919 |
| KR 2006026244 | A | KR 2004-75095 | 20040920 |

PRIORITY APPLN. INFO: KR 2004-75095 20040920

INT. PATENT CLASSIF.:

IPC ORIGINAL: H01L0021-02 [I,C]; H01L0021-02 [I,C];
 H01L0021-302 [I,A]; H01L0021-336 [I,A];
 H01L0021-336 [I,A]; H01L0021-70 [I,C];
 H01L0021-70 [I,C]; H01L0021-82 [I,A]; H01L0021-84
 [I,A]; H01L0027-00 [I,A]; H01L0029-02 [I,C];
 H01L0029-04 [I,A]; H01L0029-66 [I,C]; H01L0029-66
 [I,C]; H01L0029-786 [I,A]; H01L0029-786 [I,A];
 H01L0051-05 [I,A]; H01L0051-05 [I,C]; H01L0051-05
 [I,C]; H01L0051-10 [I,A]; H01L0051-40 [I,A]

BASIC ABSTRACT:

US 20060060855 A1 UPAB: 20060421

NOVELTY - A thin-film transistor comprises **substrate**, source and drain electrodes, **semiconductor** layer, gate electrode, and gate insulator formed between the gate electrode and each of source and drain electrodes and a channel region of **semiconductor** layer. The thickness of gate insulator between the gate electrode and each of source and drain electrodes is greater than the thickness of gate insulator between the gate electrode and channel region.

DETAILED DESCRIPTION - A thin-film transistor (TFT) comprises source and drain electrodes (220a, 220b) and a **semiconductor** layer (230) formed on a **substrate** (210), a gate electrode (250) insulated from the source and drain electrodes and the **semiconductor** layer, and a gate insulator formed between the gate electrode and each of the source and drain electrodes and a channel region of **semiconductor** layer. The

thickness of portion(s) of the gate insulator between the gate electrode and each of the source and drain electrodes is greater than the thickness of portion(s) of the gate insulator between the gate electrode and the channel region. The channel region is formed between the source and drain electrodes.

INDEPENDENT CLAIMS are also included for:

(1) a flat display device comprising a **substrate** having a display region, the above TFT, and a pixel layer formed on the display region; and

(2) fabrication of TFT by forming source and drain electrodes above a **surface** of a **substrate**, forming a **semiconductor** layer above the source and drain electrodes and comprising a channel region between the source and drain electrodes, forming a gate insulator above the **semiconductor** layer, and forming a gate electrode above at least the channel region, where the thickness of portion(s) of the gate insulator between the gate electrode and each of the source and drain electrodes is greater than the thickness of portion(s) of the gate insulator between the gate electrode and channel region.

USE - The organic TFT is useful in flat **panel** display device or organic electroluminescent device. It may be used in LCD device and in formation of driver circuits and other digital and/or analog circuitry.

ADVANTAGE - Poor performance related to cross-talk between adjacent transistors is reduced. Malfunctioning of pixels of the flat display device including the organic TFT is reduced, improving the quality of flat display device. Higher gain of transistor can be achieved by a desired increased capacitance between the gate and the channel, without suffering the consequences of undesired higher capacitance between the gate and both the drain and the source. The TFT can be manufactured at lower costs.

DESCRIPTION OF DRAWINGS - The figure is a sectional view of an organic electroluminescent display device.

Pixel unit (200a)

Organic TFT layer (200b)

Substrate (210)

Source and drain electrodes (220a, 220b)

Lower electrode (220c)

Semiconductor layer (230)

First gate insulator (240a)

Second gate insulator (240b)

Gate electrode (250)

Upper electrode (250c)

Planarization layer (260)

First electrode layer (270)

Pixel-defining layer (280)

Organic electroluminescent emission unit (290)

Second electrode layer (300) MANUAL CODE:

CPI: A12-E11C; E06-A03; E06-

D16; E06-D18;

E07-B01; E08-A; E08-B; E08-C01; E08-D02;
 E10-J02B4; E23-B; E24-A06; E31-P03; E31-P06D;
 E34-C02; E35-J; E35-K04; E35-L; E35-N; L03-G05B6;
 L03-G05F; L04-E01E
 EPI: U11-C18A1; U12-B03A; U12-B03C; U14-H01A;
 U14-K01A2B

TECH

ELECTRONICS - Preferred Components: Each of the source and drain electrodes forms an ohmic contact with the **semiconductor** layer. Portion(s) of the gate insulator is tapered.

Preferred Method: Formation of gate insulator includes forming the gate insulator on the entire **surface** of **semiconductor** layer, and removing portion(s) of the gate insulator above the channel region using a laser beam or by masking and etching. Alternatively, fabrication of TFT by forming source and drain electrodes on a **substrate**, forming a **semiconductor** layer above the source and drain electrodes and including a channel region between the source and drain electrodes, forming a first gate insulator (240a) above the **semiconductor** layer, forming a second gate insulator (240b) above the first gate insulator, and forming a gate electrode above the channel region, where the thickness of portion(s) of the second gate insulator between the gate electrode and each of the source and drain electrodes is greater than the thickness of portion(s) of the second gate insulator between the

gate electrode and the channel region.

METALLURGY - Preferred Materials: The source and drain electrodes comprise gold, gold/titanium, gold/chromium, platinum, platinum/palladium, and/or nickel. The gate insulator comprises a layer of silicon dioxide, silicon nitride, aluminum oxide, tantalum pentoxide, barium strontium titanate, or lead zirconium titanate.

ORGANIC CHEMISTRY - Preferred Materials: The **semiconductor** layer comprises pentacene, tetracene, anthracene, naphthalene, alpha-6-thiophene, perylene or its derivatives, rubrene or its derivatives, coronene or its derivatives, perylenetetracarboxylic diimide or its derivatives, perylenetetracarboxylic dianhydride or its derivatives, metal-containing **phthalocyanine** or its metal-free **phthalocyanine** and derivatives, pyromelic dianhydride or its derivatives, pyromelic diimide or its derivatives, perylenetetracarboxylic acid dianhydride or its derivatives, perylenetetracarboxylic diimide or its derivatives, naphthalene tetracarboxylic acid diimide or its derivatives, and/or naphthalene tetracarboxylic acid dianhydride or its derivatives.

POLYMERS - Preferred Materials: The gate insulator may comprise a layer of polymethyl methacrylate (PMMA), polystyrene (PS), phenol-containing polymer, acryl-containing polymer, imidé-containing polymer including polyimide, arylether-containing polymer, amide-containing polymer, **fluorine**-containing polymer, polymers containing p-xylene, vinyl **alcohol** -containing polymer, and/or parylene. The **semiconductor** layer may comprise polythiophene or its derivatives, polyparaphenylenevinylene or its derivatives, polyparaphenylene or its derivatives, polyflorene or its derivatives, polythiophene-heteroaromatic ring copolymer or its derivatives, oligoacene of naphthalene or its derivatives, and/or oligothiophene of alpha-5-thiophene or its derivatives.

L113 ANSWER 40 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2006-081746 [09] WPIX
 DOC. NO. CPI: C2006-030018 [09]
 DOC. NO. NON-CPI: N2006-070850 [09]
 TITLE: Two-terminal **semiconductor** device used as light emitting device, e.g. light emitting diode or laser, comprises abrupt metal-insulator transition **semiconductor** organic or inorganic material layer
 DERWENT CLASS: L03; U12; V08
 INVENTOR: CHAE B G; KANG K Y; KIM G; KIM H T; KIM S H; LIM Y S; MAENG S; YOUN D H; KIM G O; MAENG S L
 PATENT ASSIGNEE: (CHAE-I) CHAE B G; (ELTE-N) ELECTRONICS & TELECOM RES INST; (KANG-I) KANG K Y; (KIMG-I) KIM G; (KIMH-I) KIM H T; (KIMS-I) KIM S H; (KOEL-N) KOREA ELECTRONIC COMMUNICATION; (LIMY-I) LIM Y S; (MAEN-I) MAENG S; (YOUN-I) YOUN D H; (ELTE-N) ELECTRONICS & TELECOM RES
 COUNTRY COUNT: 40

PATENT INFORMATION:

| PATENT NO | KIND DATE | WEEK | LA | PG | MAIN IPC |
|----------------|-----------------------|------|--------|----|------------|
| EP 1617482 | A2 20060118 (200609)* | EN | 35[23] | | |
| US 20060011942 | A1 20060119 (200609) | EN | | | |
| JP 2006032898 | A 20060202 (200610) | JA | 27 | | |
| CN 1722489 | A 20060118 (200639) | ZH | | | H01L049-00 |
| KR 2006006195 | A 20060119 (200659) | KO | | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-------------------|------|------------------|----------|
| EP 1617482 A2 | | EP 2004-257769 | 20041214 |
| US 20060011942 A1 | | US 2004-11878 | 20041213 |
| CN 1722489 A | | CN 2004-10103374 | 20041220 |
| JP 2006032898 A | | JP 2004-381971 | 20041228 |
| KR 2006006195 A | | KR 2004-55096 | 20040715 |

PRIORITY APPLN. INFO: KR 2004-55096 20040715

INT. PATENT CLASSIF.:

IPC ORIGINAL: H01L0021-70 [I,C]; H01L0021-8232 [I,A];
 H01L0021-8246 [I,A]; H01L0027-105 [I,A];
 H01L0029-00 [I,A]; H01L0029-00 [I,A]; H01L0029-66
 [I,C]; H01L0029-772 [I,A]; H01L0031-0264 [I,C];
 H01L0031-0328 [I,A]; H01L0049-00 [I,A];
 H01L0049-02 [I,A]; H01L0051-05 [I,A];
 H01L0027-115 [I,A]

BASIC ABSTRACT:

EP 1617482 A2 UPAB: 20060206

NOVELTY - A 2-terminal **semiconductor** device (100) comprises first electrode layer (141) as a **substrate** (110); abrupt metal-insulator transition (MIT) **semiconductor** organic or inorganic material layer (130), having an energy gap less than 2eV and holes in a hole level, disposed on the first electrode layer; and second electrode layer (142) disposed on the abrupt MIT **semiconductor** organic or inorganic material layer.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method of manufacturing a 2-terminal **semiconductor** device comprising forming a first electrode on a **substrate**; forming an abrupt MIT **semiconductor** material layer having an energy gap less than 2eV and holes in a hole level, disposed on the first electrode layer; and forming a second electrode layer on the abrupt MIT **semiconductor** material layer.

USE - Used as light emitting device, e.g. LED or laser.

ADVANTAGE - The invented a 2-terminal **semiconductor** device can be formed readily with a low cost without generating a structural phase transition.

DESCRIPTION OF DRAWINGS - The figure is a cross-sectional view of a 2-terminal **semiconductor** device.

Device (100)

Substrate (110)

Buffer layer (120)

Material layer (130)

Electrode layers (141, 142) MANUAL CODE:

CPI: L04-A; L04-A04; L04-C11C

EPI: U12-A01A1; U12-A01B1; U12-E02; V08-A01A;

V08-A04A

TECH

ELECTRONICS - Preferred Component: The **p-type** organic **semiconductor** to which a low concentration of holes is added is a D+A- type in which D+ is an organic donor and A- is an organic acceptor.

INORGANIC CHEMISTRY - Preferred Component: The abrupt MIT **semiconductor** material layer includes a **p-type** semiconductor of silicon (Si), germanium (Ge), aluminum, arsenic (As), antimony, boron (B), nitrogen (N), gallium, phosphorus (P), indium, tellurium (Te), silver, cadmium, zinc (Zn), lead, sulfur, bismuth (Bi), potassium (K), hydrogen, beryllium, oxygen or carbon to which a low concentration of holes is added or a **p-type** compound **semiconductor** composed of these elements. It includes a **p-type** semiconductor of yttrium, praseodymium, barium, copper, lanthanum, strontium, titanium, vanadium, calcium (Ca), iron, tungsten, molybdenum, niobium, aluminum, hafnium, tantalum, zirconium, lanthanum, bismuth, palladium or oxygen to which a low concentration of holes is added or a **p-type** compound **semiconductor** composed of these elements. The **p-type** **semiconductor** to which a low concentration of holes is added includes Si(100), Si(111), Si(110), Si:B, Si:P, Ge(100), silicon carbide, Si-Ge, aluminum arsenide, indium aluminum arsenide, aluminum-antimonide, boron nitride, gallium arsenide, indium gallium arsenide, gallium phosphide,

gallium-antimonide, $GaxSb_{1-x}$, $GexSb_{1-x'}$, indium nitride, indium arsenide, indium phosphide, indium antimonide, $InxSb-1-x'$, $GeaInbSbCTCd$, $Inx''SbyTez$, $Aga'lnbSb'c'Ted'$, $Tea'Geb'Snc'Aud'$, silver antimony telluride, silver indium telluride, germanium cadmium sulfide, cadmium selenide, cadmium telluride, zinc sulfide, zinc selenide, zinc telluride, lead sulfide, lead selenide, lead telluride, Grey tin (Sn), Grey selenium, Sb, Te, $Sb_{1-x}Tex$, B, DAC (Diamond-like Amorphous-C), TAC(Tetrahedral Amorphous-C):N, a-C;H(Amorphous hydrogenated carbon layers, or DLC(Diamond-Like Carbon), K4C60, K6C60, Ga-As-Si system, Ga-GaAs-Ge system, Ga-GaAs-Sn, Ga-As-Sn system, Ga-As-Zn system, Ga-P-Si system, Ga-P-Zn system, Ga-P-Ge system, GaP-Bi system, GeTe-Bi₂Te₃, GeSb₂Te₄, gallium phosphide:N, GaAs:Ca, GaAs:K, GaAs:chlorine, or GeBi₂Te₄.

```

x=0-0.5;
x'=0-0.2;
x'0-0.5;
a=less than or equal to 0.2;
b=0-0.2;
c=0.5-1;
d=0-0.5;
x';=0-0.2;
y=0.5-1;
z=0-0.3;
a'=0-0.2;
b'=0-0.2;
c'=0.5-1;
d'=0-0.5;
a'=0.5-1;
b'=0-0.2;
c'=0-0.3;
d'=0-0.5;
x1=0-0.5.
```

Preferred Material: The first and second electrode layers include tungsten, molybdenum, gold/chromium, titanium/tungsten, titanium/aluminum nitride, nickel chromide, aluminum/gold, platinum, chromium/molybdenum/gold, YBa₂Cu₃O_{7-d} or nickel/molybdenum/gold.

ORGANIC CHEMISTRY - Preferred Component: The abrupt MIT **semiconductor** material layer includes a **p-type semiconductor** of silicon (Si), germanium (Ge), aluminum, arsenic (As), antimony, boron (B), nitrogen (N), gallium, phosphorus (P), indium, tellurium (Te), silver, cadmium, zinc (Zn), lead, sulfur, bismuth (Bi), potassium (K), hydrogen, beryllium, oxygen or carbon to which a low concentration of holes is added or a **p-type compound semiconductor** composed of these elements. It includes a **p-type semiconductor** of yttrium, praseodymium, barium, copper, lanthanum, strontium, titanium, vanadium, calcium (Ca), iron, tungsten, molybdenum, niobium, aluminum, hafnium, tantalum, zirconium, lanthanum, bismuth, palladium or oxygen to which a low concentration of holes is added or a **p-type compound semiconductor** composed of these elements. The **p-type semiconductor** to which a low concentration of holes is added includes Si(100), Si(111), Si(110), Si:B, Si:P, Ge(100), silicon carbide, Si-Ge, aluminum arsenide, indium aluminum arsenide, aluminum-antimonide, boron nitride, gallium arsenide, indium gallium arsenide, gallium phosphide, gallium-antimonide, $GaxSb_{1-x}$, $GexSb_{1-x'}$, indium nitride, indium arsenide, indium phosphide, indium antimonide, $InxSb-1-x'$, $GeaInbSbCTCd$, $Inx''SbyTez$, $Aga'lnbSb'c'Ted'$, $Tea'Geb'Snc'Aud'$, silver antimony telluride, silver indium telluride, germanium cadmium sulfide, cadmium selenide, cadmium telluride, zinc sulfide, zinc selenide, zinc telluride, lead sulfide, lead selenide, lead telluride, Grey tin (Sn), Grey selenium, Sb, Te, $Sb_{1-x}Tex$, B, DAC (Diamond-like Amorphous-C), TAC(Tetrahedral

Amorphous-C):N, a-C;H(Amorphous hydrogenated carbon layers, or DLC(Diamond-Like Carbon), K4C60, K6C60, Ga-As-Si system, Ga-GaAs-Ge system, Ga-GaAs-Sn, Ga-As-Sn system, Ga-As-Zn system, Ga-P-Si system, Ga-P-Zn system, Ga-P-Ge system, GaP-Bi system, GeTe-Bi₂Te₃, GeSb₂Te₄, gallium phosphide:N, GaAs:Ca, GaAs:K, GaAs:chlorine, or GeBi₂Te₄.

```
x=0-0.5;
x'=0-0.2;
x''=0.5;
a=less than or equal to 0.2;
b=0-0.2;
c=0.5-1;
d=0-0.5;
x'':=0-0.2;
y=0.5-1;
z=0-0.3;
a'=0-0.2;
b'=0-0.2;
c'=0.5-1;
d'=0-0.5;
a'=0.5-1;
b'=0-0.2;
c'=0-0.3;
d'=0-0.5;
x1=0-0.5.
```

Preferred Material: The first and second electrode layers include tungsten, molybdenum, gold/chromium, titanium/tungsten, titanium/aluminum nitride, nickel chromide, aluminum/gold, platinum, chromium/molybdenum/gold, YBa₂Cu₃O_{7-d} or nickel/molybdenum/gold.

ORGANIC CHEMISTRY - Preferred Component: The D+A- type includes D+A- = TTF + Br, BEDT-TTF, or TMPD + TCNQ, where TTF is tetrathiofulvalene, BEDT-TTF is bis-ethylenedithio-tetrathiofulvalene, TMPD is N,N,N',N'-tetramethyl-p-phenylenediamine, and TCNQ is tetracyano-p-quinodimethane, and the TCNQ is an active component that is switching between the TCNQ- and TCNQ by injecting holes. The p-type organic **semiconductor** includes pentacene and its derivatives, thiophene and thiophene oligomer, benzodithiophene dimer, **phthalocyanine**, poly(alkyl-thiophene), Poly(3-hexyl-thiophene), poly(3-octyl-thiophene), Poly(3-dodecyl-thiophene), anthradithiophene (ADT), dihexyl-ADT, didodecyl-ADT, thiophene derivatives that include dioctadecyl-ADT, or an aromatic compound.

| | | |
|----------------------|--|-------------------------|
| L113 ANSWER 41 OF 72 | WPIX COPYRIGHT 2007 | THE THOMSON CORP on STN |
| ACCESSION NUMBER: | 2005-702957 [72] | WPIX |
| DOC. NO. CPI: | C2005-213900 [72] | |
| DOC. NO. NON-CPI: | N2005-576805 [72] | |
| TITLE: | Field effect transistor comprises organic semiconductor layer containing monobenzoporphyrin compound with specific x-ray diffraction | |
| DERWENT CLASS: | E12; E23; L03; U11; U12 | |
| INVENTOR: | MASUMOTO A; MIURA D; NAKAYAMA T | |
| PATENT ASSIGNEE: | (CANO-C) CANON KK | |
| COUNTRY COUNT: | 107 | |

PATENT INFORMATION:

| PATENT NO | KIND DATE | WEEK | LA | PG | MAIN IPC |
|---------------|-----------------------|------|-------|----|------------|
| <hr/> | | | | | |
| WO 2005091394 | A1 20050929 (200572)* | EN | 48[9] | | H01L051-00 |
| JP 2005277029 | A 20051006 (200572) | JA | 17 | | H01L051-00 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|------------------|------|----------------|----------|
| WO 2005091394 A1 | | WO 2005-JP5306 | 20050316 |
| JP 2005277029 A | | JP 2004-87077 | 20040324 |

PRIORITY APPLN. INFO: JP 2004-87077 20040324

INT. PATENT CLASSIF.:

MAIN: H01L051-00

SECONDARY: C07F001-08; H01L029-786

BASIC ABSTRACT:

WO 2005091394 A1 UPAB: 20051223

NOVELTY - A field effect transistor comprises an organic **semiconductor** layer containing a compound having a **monobenzoporphyrin** skeleton and having x-ray diffraction as given in specification.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for the production of the field effect transistor comprising the compound having a **monobenzoporphyrin** skeleton of formula (I) involving heating a **monobicycloporphyrin** compound of formula (II) to form (I).

R1 - R4=H, halo, OH, 1-12C (oxy)alkyl, 1-12C alkenyl, 1-12C thioalkyl, 1-12C alkyl ester or 1-12C aryl;

R3=H or aryl; and

M=two H atoms, a metal atom or a metal oxide.

Provided that adjacent R1 and R2 may be same or different and at least two of R2 are not H atoms.

USE - As field effect transistor (claimed).

ADVANTAGE - The field effect transistor stably forms an organic **semiconductor** layer having high crystallinity and orientation, and exhibiting a high field-effect mobility at a broad range of temperature including low temperature. The field effect transistors are produced easily and have high field-effect mobility.

MANUAL CODE: CPI: E05-L03B; E06-D18; L04-A04; L04-E01A

EPI: U11-A01F; U12-B03C; U12-D02

ABEX DEFINITIONS - Preferred Definitions: - R1 - R3=H or 1-12C alkyl; and - M=H or copper.

EXAMPLE - A field effect transistor was prepared as follows. A highly doped N-type silicon substrate was used as the gate electrode. A silicon oxide film with a thickness of 5000Angstrom was used as the gate insulating layer. A solution of monobicycloporphyrin copper complex (1 wt.%) was spin-cast on the substrate to form a coating. The substrate was heated to 220degreesC to form an organic semiconductor layer with a film thickness of 120 nm. Gold was vapor-deposited on it to form the source and drain electrode at room temperature. Thus a field effect transistor with a channel length of 50 microns and channel width of 3 mm was prepared.

L113 ANSWER 42 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2005-664527 [68] WPIX

DOC. NO. NON-CPI: N2005-544271 [68]

TITLE: Field effect transistor has organic semiconductor layer containing porphyrin, and layer comprising polysiloxane compound, intimately contacted with organic semiconductor layer by lamination

DERWENT CLASS: U11; U12

INVENTOR: KUBOTA M; MASUMOTO A; MIURA D; MIYACHI M; NAKAYAMA T; OHNISHI T; TSUZUKI H

PATENT ASSIGNEE: (CANO-C) CANON KK

COUNTRY COUNT: 107

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|--------|------------|
| WO 2005086254 | A1 | 20050915 | (200568)* | EN | 107[9] | H01L051-00 |
| JP 2005294809 | A | 20051020 | (200569) | JA | 52 | H01L051-00 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|------------------|------|----------------|----------|
| WO 2005086254 A1 | | WO 2005-JP4586 | 20050309 |
| JP 2005294809 A | | JP 2005-46256 | 20050222 |

PRIORITY APPLN. INFO: JP 2004-67671 20040310

INT. PATENT CLASSIF.:

MAIN: H01L051-00
 SECONDARY: H01L021-336; H01L029-786

BASIC ABSTRACT:

WO 2005086254 A1 UPAB: 20051223

NOVELTY - A field effect transistor has an organic **semiconductor** layer (6) containing **porphyrin** (s), and a layer comprising polysiloxane compound(s), laminated on the organic **semiconductor** layer, such that both the layers are in intimate contact.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(1) manufacture of field effect transistor, which involves laminating the organic **semiconductor** layer and the layer comprising polysiloxane such that both the layers are in intimate contact; and

(2) manufacture of laminated component having organic **semiconductor** layer, which involves providing a crystallization promoting layer on a **substrate** (8), providing the organic **semiconductor** precursor on the crystallization promoting layer, and applying energy to the **semiconductor** precursor to form layer comprising organic **semiconductor**.

USE - As field effect transistor.

ADVANTAGE - The field effect transistor has high field effect mobility and favorable ON/OFF ratio. The organic **semiconductor** layer has high crystallinity and orientation.

DESCRIPTION OF DRAWINGS - The figures show schematic sectional views of field effect transistor.

gate electrode (1)
 gate insulating layer (2)
 drain electrode (5)
 organic **semiconductor** layer (6)
 substrate (8)

MANUAL CODE: EPI: U11-C18A3; U12-B03C; U12-D02A

TECH

ORGANIC CHEMISTRY - Preferred **Porphyrin**: The **porphyrin** is shown by formula (3).

R11=H, halogen atom, hydroxyl, alky, oxyalkyl, thioalkyl or 1-12C alkylester, and couples to form aromatic ring optionally having substituent, and further is optionally connected to another **porphyrin** ring through formed aromatic ring;

R12=H or (un)substituted aryl; and

X=H or metal atom.

The aromatic ring formed by at least one pair of adjacent group (R11) is obtained by heating a precursor having a bicyclo(2.2.2)octadiene skeleton structure optionally having substituent. Preferred Properties: The Bragg angles (2theta) of CuK(alpha)X-ray diffraction in the organic **semiconductor** layer have peaks at 8.3degreesplus minus0.2degrees, 10.1degreesplus minus0.2degrees, 11.8degreesplus minus0.2degrees, and 14.4degreesplus minus0.2degrees, preferably at 8.4degreesplus minus0.2degrees, 11.9degreesplus minus0.2degrees and 16.9degreesplus minus0.2degrees, and more preferably at 7.3degreesplus minus0.2degrees, 7.8degreesplus minus0.2degrees, 11.7degreesplus minus0.2degrees and 19.6degreesplus minus0.2degrees. Preferred Process: The crystallization-promoting layer has a function of promoting bonding between crystal grains.

The energy applied to the organic **semiconductor** layer is light or heat energy. The organic **semiconductor** layer is subjected to elimination reaction, such as retro Diels-Alder reaction, while applying energy. The energy is continuously applied even after completion of the elimination reaction. The organic **semiconductor** precursor is provided by applying or printing a solution containing the organic

semiconductor precursor. The crystallization-promoting layer contains the polysiloxane compound.

POLYMERS - Preferred Polysiloxane Compound: The polysiloxane compound is shown by formula (1). The polysiloxane compound comprises polysiloxane compounds shown by formula (2) and/or formula (6).

R1-R4=(un)substituted alkyl, 1-5C alkenyl, (un)substituted phenyl, or siloxane unit;

n=1 or more;

R7-R10, R21-R24=(un)substituted alkyl, 1-5C alkenyl or (un)substituted phenyl; m-p=0 or more; and m+n and o+p=1 or more.

ABEX SPECIFIC COMPOUNDS - Approximately 34 examples for **porphyrin** compound such as compounds of formulae (A,B) are disclosed.

EXAMPLE - A highly doped N-type silicon substrate was provided as a gate electrode. A silicon oxide film having thickness of 5000Angstrom obtained by thermal oxidation of **surface** layer of **silicon substrate** was provided as a insulating layer. A resin solution (a) obtained by dissolving flaky methyl silsesquioxane (in g) (1) in mixed solvent containing ethanol (49.5) and 1-butanol (49.5), was applied to the **surface** of the insulating layer by spin coating method. Next, the applied film was moved onto a hot **plate** and heated at 100degreesC for 5 minutes and 200degreesC for 20 minutes, to form polysiloxane layer with thickness of 50 nm. Next, metal-free tetrabicyclo compound (formula (9)) in powder-form was heated in vacuum at 200degreesC, and then formed into a film on the **substrate** by using a vacuum vapor deposition apparatus, to form organic **semiconductor** layer with thickness of 100 nm. A field effect transistor having a channel length of 50 microns and a channel width of 3 mm was produced. The obtained field effect transistor had mobility of 1.1x10⁻¹ cm²/Vs and ON/OFF ratio of 2.1x10⁵.

L113 ANSWER 43 OF 72. WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2005-181833 [19] WPIX

DOC. NO. CPI: C2006-120511 [39]

DOC. NO. NON-CPI: N2006-315406 [39]

TITLE: Epoxy resin composition for sealing **semiconductor** element e.g. diode, contains epoxy resin, inorganic filler, and preset amount of black organic pigment, phthalocyanine-type compound and/or titanium group black pigment as coloring agent

DERWENT CLASS: A21; A85; L03; U11

INVENTOR: FUJII M; ISHIGURO T; TAKEMIYA K

PATENT ASSIGNEE: (HITB-C) HITACHI CHEM CO LTD

COUNTRY COUNT: 106

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|-------|------------|
| WO 2005012386 | A1 | 20050210 | (200519)* | JA | 39[0] | C08G059-62 |
| JP 2005054045 | A | 20050303 | (200519) | JA | 25 | C08G059-62 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|------------------|------|-----------------|----------|
| WO 2005012386 A1 | | WO 2004-JP11088 | 20040803 |
| JP 2005054045 A | | JP 2003-285771 | 20030804 |

PRIORITY APPLN. INFO: JP 2003-285771 20030804
INT. PATENT CLASSIF.:

MAIN: C08G059-62
 SECONDARY: C08K003-00; C08K005-00; C08L063-00; H01L023-29;
 H01L023-31

BASIC ABSTRACT:

WO 2005012386 A1 UPAB: 20060620

NOVELTY - An epoxy resin composition contains an epoxy resin, a curing agent, a curing accelerator, a coloring agent and inorganic filler. The coloring agent is black organic pigment, **phthalocyanine**-type compound and/or titanium group black pigment. Content of coloring agent in the resin composition is 0.01-1 weight% with respect to resin composition.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for electronic apparatus, which has an element sealed using the epoxy resin composition.

USE - For sealing **semiconductor** element such as resistor, coil, transistor, **semiconductor** chip, diode and thyristor mounted on lead frame, circuit board, tape carrier, glass **substrate** or **silicon wafer**, for resin-sealed integrated circuit (IC) such as ball grid array (BGA), chip size package (CSP), chip on board (COB) module, dual inline package (DIP), plastic leaded chip carrier (PLCC), quad flat package (QFP), small outline package (SOP), small outline J-lead package (SOJ), thin small outline package (TSOF), thin quad flat package (TQFP) and tape carrier package (TCP), for electronic apparatus (claimed).

ADVANTAGE - The epoxy resin composition provides electronic component apparatus having improved insulation reliability, productivity, exterior and sensitivity to laser, with reduced electrical property defect. MANUAL CODE: CPI: A05-A01E2; A05-C01B; A08-D; A12-E04;

A12-E07; L04-C20A

EPI: U11-A07

TECH

ORGANIC CHEMISTRY - Preferred Component: The black organic pigment is of formula (I).

(MK1) n=1-20.

The central metal of **phthalocyanine**-type compound is vanadium or its oxide. Preferred Property: The titanium-group black pigment has average particle diameter of 2 μm or less.

POLYMERS - Preferred Properties: The epoxy resin has viscosity of 2 poise or less at 150degreesC. The epoxy resin composition has chromium content of 100 ppm or less and inorganic filler content of 80-92 wt.%. Preferred Resin: The epoxy resin is biphenyl-type epoxy resin, bisphenol F type epoxy resin, stilbene-type epoxy resin, sulfur atom-containing epoxy resin, novolak-type epoxy resin, dicyclopentadiene-type epoxy resin, naphthalene-type epoxy resin, triphenylmethane-type epoxy resin and/or biphenylene-type epoxy resin. Preferred Component: The hardener contains biphenyl-type phenol resin, aralkyl-type phenol resin, dicyclopentadiene-type phenol resin, triphenylmethane-type phenol resin and/or novolak-type phenol resin.

ABEX EXAMPLE - YX-4000H (biphenyl-type epoxy resin having epoxy equivalent of 192) (in weight parts) (90), ESB-400 (brominated epoxy resin having epoxy equivalent of 400 and bromine content of 49%) (10), antimony trioxide (5), XL-225-3 (aralkyl-type phenol resin having hydroxyl equivalent of 175) of formula (XVIII) (85), addition product of triphenyl phosphine and benzoquinone (as hardening accelerator) (3), PED-191 (polyethylene wax) (2), A-187 (epoxy silane) (5), YKR-3082 (**phthalocyanine** compound) (5), NCC319BS (diamond black having chromium content of 100 ppm or less) (5) and S-CO (globular form silica) (1600), were premixed. The obtained mixture was mixed at 80degreesC for 10 minutes, cooled and ground to obtain epoxy resin composition. The additional amount of silica with respect to epoxy resin composition was 88.4 wt.%, and additional amount of **phthalocyanine** pigment and diamond black was 0.28 wt.% each. The resin composition was molded using a transfer molding machine, to obtain molded product. The molded product had spiral flow distance (fluidity index) of 115 cm, shore D-type hardness of 82, volume resistivity of 5×10^{13} OMEGA.cm at 150degreesC, favorable color tone, laser mark property and insulation reliability. - (MK1) n=1-8.

L113 ANSWER 44 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2005-142402 [15] WPIX
 DOC. NO. CPI: C2005-046367 [15]
 DOC. NO. NON-CPI: N2005-121146 [15]
 TITLE: Layered component for electronic components,
 comprises **substrate**, dielectric
 material having pores and coupled to
substrate, and **self-**
assembled diffusion blocking material
 coupled and attracted to dielectric material
 DERWENT CLASS: A85; L03; P73; U11
 INVENTOR: IWAMOTO N; KENNEDY J; LEE E
 PATENT ASSIGNEE: (HONE-C) HONEYWELL INT INC; (IWAM-I) IWAMOTO N;
 (KENN-I) KENNEDY J; (LEEE-I) LEE E
 COUNTRY COUNT: 106

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|--------|------------|
| WO 2005008761 | A1 | 20050127 | (200515)* | EN | 89[34] | H01L021-31 |
| US 20050238889 | A1 | 20051027 | (200571) | EN | | B32B009-04 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-------------------|-------------|-----------------|----------|
| WO 2005008761 A1 | | WO 2004-US21738 | 20040707 |
| US 20050238889 A1 | Provisional | US 2003-486878P | 20030710 |
| US 20050238889 A1 | | US 2004-875050 | 20040622 |

PRIORITY APPLN. INFO: US 2004-875050 20040622
 US 2003-486878P 20030710

INT. PATENT CLASSIF.:

MAIN: B32B009-04; H01L021-31
 SECONDARY: B32B003-26; C07C013-28

BASIC ABSTRACT:

WO 2005008761 A1 UPAB: 20060121

NOVELTY - Layered component comprises a **substrate**, a dielectric material having pores and coupled to the **substrate**, and a **self-assembled** diffusion blocking material coupled and attracted to the dielectric material.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for:

(a) method of minimizing diffusion of metal atoms, reactive etchants or chemical vapor deposition (CVD) or atomic layer deposition (ALD) precursor material into material having pores, which involves providing a precursor material comprising a carbon-including material, providing a solvent carrier solution, combining the precursor material and the solvent carrier solution to form a diffusion blocking reactive solution, and applying the diffusion blocking reactive solution to the material having pores to form a diffusion blocking material; and

(b) electronic and **semiconductor** components comprising the layered material.

USE - For electronic component and **semiconductor** component (both claimed), e.g. circuit boards, chip packaging, separator sheets, dielectric components of circuit boards, printed wiring boards, capacitors, inductors, resistors, diodes, rectifiers, fuses, lasers, thyristors, and photosensors, electronic-based products, e.g. televisions, computers, cell phones, pagers, palm-type organizers, portable radios, car stereos, and remote controls, and power source components, such as batteries, coils, and fuel cells.

ADVANTAGE - Layered component comprises layer or material which can effectively reduce the diffusion of migratory atoms, molecules and/or diffusants, such as conductive molecules, conductive atoms, metal atoms, metal-including molecules, reactive etchants, and/or ALD or CVD precursor materials into a porous dielectric layer. The reactive or non-reactive blocking material can be **self-assembled** at the **surface** of the dielectric using surface energy, adsorption, absorption, solubility, adhesion/cohesion, and shape or molecular architecture of the blocking material. The diffusion blocking material reacts or interacts through either bond or strong non-bond forces with the pore wall, diffuses into the pores and reacts or interacts to decrease the pore diameter, and thus does not allow further diffusion of substances smaller than the new pore diameter, expands in the pore to block the pore and

thus cannot diffuse further themselves because of size, and reduces the effective pore diameter and effective diffusion constant.

MANUAL CODE: CPI: A10-E01; A12-E01; L04-C12; L04-E
EPI: U11-C05B9A; U11-C05D1

TECH

INORGANIC CHEMISTRY - Preferred Component: The **substrate** comprises layers comprising **silicon wafer(s)**.

The layered material further comprises a removable metal cap layer. The diffusion blocking material forms a continuous layer which decreases the diffusion of metal atoms, reactive etchants, or CVD or ALD precursor material into the dielectric material by at least 50 %, preferably 75 %. Preferred Materials: The dielectric material comprises a low dielectric-constant dielectric material comprising inorganic compound(s). The diffusion blocking material comprises a dense carbon-including material or dense inorganic material, preferably a dense rigid core surrounded by a dense, more flexible matrix. The diffusion blocking material is larger than the pore by an average cross-sectional area ratio greater than 1.5:1, preferably greater than 2:1. The diffusion blocking materials form a diffusion blocking layer. The diffusion blocking material comprises metal-ligand compound and/or CVD or ALD precursor material. At least one ligand is coupled to a metal atom. The dense carbon-including material comprises graphite, diamond, **porphyrin** layer, cyanine layer,

polyporphyrin layer, and/or conductive polymer. Preferred Property: The density of the carbon-including material is greater than 1.5 g/cc at the interface. Preferred Method: Ligand-metal couple(s), and/or a combination of ligand material and a metal ion solution are applied to the material having pores.

METALLURGY - Preferred Metals: The metal atom is copper, iron, cobalt, titanium, tantalum, silver, magnesium, aluminum, gold, zinc, tungsten or chromium.

ORGANIC CHEMISTRY - Preferred Component: The **substrate** comprises layers comprising **silicon wafer(s)**.

The layered material further comprises a removable metal cap layer. The diffusion blocking material forms a continuous layer which decreases the diffusion of metal atoms, reactive etchants, or CVD or ALD precursor material into the dielectric material by at least 50 %, preferably 75 %. Preferred Materials: The dielectric material comprises a low dielectric-constant dielectric material comprising inorganic compound(s). The diffusion blocking material comprises a dense carbon-including material or dense inorganic material, preferably a dense rigid core surrounded by a dense, more flexible matrix. The diffusion blocking material is larger than the pore by an average cross-sectional area ratio greater than 1.5:1, preferably greater than 2:1. The diffusion blocking materials form a diffusion blocking layer. The diffusion blocking material comprises metal-ligand compound and/or CVD or ALD precursor material. At least one ligand is coupled to a metal atom. The dense carbon-including material comprises graphite, diamond, **porphyrin** layer, cyanine layer,

polyporphyrin layer, and/or conductive polymer. Preferred Property: The density of the carbon-including material is greater than 1.5 g/cc at the interface. Preferred Method: Ligand-metal couple(s), and/or a combination of ligand material and a metal ion solution are applied to the material having pores.

ORGANIC CHEMISTRY - Preferred Materials: The dielectric material comprises organic compound(s), with at least one being a cage compound. At least one cage compound comprises adamantane. The diffusion blocking material comprises flat aromatic molecule(s) oriented flat to the **substrate**. The diffusion blocking reactive solution is physically attracted to the dielectric material. The layer of blocking material comprises reactive functionalities coupled to the porous surface. The interaction of the reactive functionalities with the porous material forms a diffusion blocking layer. At least one functionality has a limited chain length for control of

penetration into the **surface**. The reactive functionality comprises a cross-linkable functionality or at least one long chain unit capped with a cross-linkable functionality. The cross-linkable functionality is cross-linked using photoinitiator, free radical initiator, acid, and/or **base**, and comprises epoxy, olefin, acetylene, siloxane, cyclo-olefin, acrylate, cyanate ester, and/or isocyanate. The reactive functionality comprises an ammonium salt, a **base**, and an acidic species whose reactions with the porous material produce a solvent soluble species which may be solvated by a solvent. The reactive functionality may act as a catalyst for polymerization of additional layer of material. Preferred Matrix: The flexible matrix comprises a capping moiety and long chain unit(s). At least one long chain unit comprises at least three single bonds. At least one long chain unit comprises alkane moiety, long chain ketone moiety, long chain ester moiety, long chain **alcohol** moiety, long chain amine moiety, long chain thiol moiety, polyoxyethylene moiety, polyoxymethylene moiety, polyalkene moiety, polyglycol moiety, polyaromatic ether moiety, polydimethylsiloxane moiety, polydialkylsiloxane moiety, and/or polyalkylarylsiloxane moiety. The capping moiety comprises at least one acidic species or at least one long chain unit capped with an acidic species. The acidic species comprises superacid and/or organic acid. The capping moiety comprises a metal ligand compound, and/or a CVD or ALD precursor. The capping moiety comprises at least one salt chosen from ammonium fluoride salt and ammonium hydroxide salt. The capping moiety comprises a photoinitiator and/or a free radical initiator, and a basic species comprising metal hydride and/or metal hydroxide. The capping moiety comprises a cross-linkable functionality or at least one long chain unit capped with a cross-linkable functionality. The capping moiety undergoes a cross-linking reaction with the porous material, with itself, or with another capping moiety. The capping moiety comprises non-polar moieties which lower the **surface** energy of the dielectric material. Preferred Core: The rigid core comprises a silsesquioxane, siloxane polymer, multicyclic siloxane, and/or multicyclic inorganic compound, and an aromatic compound comprising **porphyrin** moiety, annulene moiety, fullerene moiety, and/or metallocene moiety. The rigid core comprises a bridged multicyclic compound and at least one multicyclic aliphatic bond comprising a cubene or a paracyclophane. Preferred Ligand: The ligand of the diffusion blocking material comprises cyanine group, **porphyrin** group, acetylide group, cyclopentadienyl group, cyclo-olefinic group, multi-olefinic group, and/or conductive polymer.

L113 ANSWER 45 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2005-112382 [12] WPIX
 DOC. NO. CPI: C2005-037607 [12]
 DOC. NO. NON-CPI: N2005-097107 [12]
 TITLE: New diazo-quinone compounds used as charge transporting substance for photosensitive layer of electrophotographic photoreceptor
 DERWENT CLASS: E13; G08; P84; S06; T04
 INVENTOR: KURODA M; OHKURA K; SEKINE N; TAKESHIMA M; UENO Y
 PATENT ASSIGNEE: (FUJI-N) FUJI ELECTRIC IMAGING DEVICE CO LTD
 COUNTRY COUNT: 106

PATENT INFORMATION:

| PATENT NO | KIND DATE | WEEK | LA | PG | MAIN IPC |
|---------------|-----------------------|------|--------|----|------------|
| WO 2005003093 | A1 20050113 (200512)* | JA | 79[14] | | C07D213-42 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|------------------|------|----------------|----------|
| WO 2005003093 A1 | | WO 2004-JP9317 | 20040701 |

PRIORITY APPLN. INFO: JP 2003-408433 20031208
 JP 2003-190022 20030702
 JP 2003-395769 20031126

INT. PATENT CLASSIF.:

MAIN: C07D213-42
 SECONDARY: C07D307-52; C07D333-20; G03G005-06

BASIC ABSTRACT:

WO 2005003093 A1 UPAB: 20050708

NOVELTY - Diazo-quinone compounds (I) are new.

DETAILED DESCRIPTION - Diazo-quinone compounds of formula (I) are new.

R1-R4 = hydrogen atom, 1-12C alkyl or aryl optionally having substituent(s) chosen from halogen atom, nitro group, alkyl, aryl, heterocyclic group, halogenated alkyl group or alkoxy group, and may couple together to form ring;

R5,R6 = aryl or heterocyclic group optionally having substituent(s);

Z' = group of formula (F-A, F-B or F-C);

R7,R8 = 1-12C alkyl optionally having substituent(s);

m,n = 0-2; and

X = sulfur atom or oxygen atom.

INDEPENDENT CLAIMS are included for the following:

(1) electrophotographic photoreceptor, which has photosensitive layer (2) on an electroconductive substrate (1). The photosensitive layer contains compound (I) and has electron transport property, as charge transporting substance, and charge generating substance; and

(2) electrophotographic apparatus having electrophotographic photoreceptor, and which performs electrical charging process, preferably positive charging process.

USE - Charge transporting substance used for photosensitive layer of photoreceptor used for electrophotographic apparatus (both claimed), such as copier and semiconductor laser printer.

ADVANTAGE - The electrophotographic photoreceptor has excellent electron transporting capacity, electrical property, durability and high sensitivity.

DESCRIPTION OF DRAWINGS - The figure shows a sectional view of an electrophotographic photoreceptor.

electroconductive substrate (1)

photosensitive layer (2)

coating layer (6)

MANUAL CODE: CPI: E10-A06B; G06-F07

EPI: S06-A01A1; S06-A01B; T04-G04C

TECH

ORGANIC CHEMISTRY - Preferred Compound: The aromatic nitrogen-containing compound is preferably of formula (I-A, I-B or I-C).

R1A-R4A, R1B-R4B, R1C-R4C = R1;

R5A, R6A, R5B, R6B, R5C, R6C = R5;

R7A = 1-12C alkyl optionally having substituent; and

R7C, R8C = 1-10C alkyl optionally having substituent, or H atom. substituent of (I-A) = halogen, nitro group, 1-6C alkyl, aryl, 1-6C halogenated alkyl or 1-6C alkoxy;

substituent of (I-B) = halogen, alkyl, alkoxy, aryl, fluorinated alkyl or nitro, or couple together to form ring; and

substituent of (I-C) = halogen, nitro group, alkyl, aryl, heterocyclic group, halogenated alkyl group or alkoxy group, or couple together to form ring.

IMAGING AND COMMUNICATION - Preferred Photoreceptor: The electrophotographic photoreceptor further has an undercoat layer. The photosensitive layer contains a resin binder and hole carrying substance.

ABEX SPECIFIC COMPOUNDS - 99 Specific compounds (I) are disclosed, such as compound of formulae (I-A-1, I-B-1, I-C-1).

EXAMPLE - Compound (in g) (17.2) of formula (b'-A-1) and thionyl chloride (29.8) were mixed and heat-refluxed. Excess thionyl chloride was removed and oil-like substance was obtained. Pyridine (47.5), N,O-dimethyl hydrochloride (19.5)

and dichloro methane solution were added to the substance and stirred for 2 hours. Compound (21.1) of formula (b-A-1) was obtained with yield of 81.7%. - Tetrahydrofuran solution of compound (b-A-1) (7.75), magnesium (2.41), 4-bromo-2,6-di-tert-butyl-1-(trimethyl siloxy) benzene (32.2) of formula (a-A-1) and tetrahydrofuran solution of Grignard reagent were mixed and stirred at room temperature for 3 hours. 1N hydrochloric acid aqueous solution was added and reaction was terminated.

Tetrahydrofuran solution of **fluorinated tetrabutyl ammonium** was added and stirred. Compound (8.12) of formula (c-A-1) was obtained with yield of 49.2%. - Compound (c-A-1) (5.48) and p-chlorophenyl hydrazine hydrochloride (5.37) were dissolved in pyridine and heat-refluxed. The reaction solution was added to hydrochloric acid water, and extracted. Crude product was obtained, and filtered and purified to obtain compound (4.9) (1-A-3) with yield of 61.7%. - Metal-less **phthalocyanine** (in weight parts) (0.3), HT1-101 (7), compound (1-A-3) as charge transporting substance (3), 3,5-di-tert-4-**hydroxytoluene** (1), KF-50 (**silicone oil**) (0.01) and Panlite TS2020 (RTM: bisphenol Z type polycarbonate resin) (10) as resin binder were mixed with methylene-chloride solvent (100), and dispersed. - A **mono-layer** photosensitive-layer dispersion liquid was obtained. An undercoat layer was provided on an aluminum **plate**. The obtained **mono-layer** photosensitive layer dispersion liquid was then applied on the undercoat layer, and dried at 100 degrees C for 60 minutes. Solvent was removed. An electrophotographic photoreceptor having photosensitive layer with thickness of 25 microns was obtained. The photoreceptor had excellent electron transporting capacity.

L113 ANSWER 46 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2006-065783 [07] WPIX
 DOC. NO. CPI: C2006-024069 [07]
 DOC. NO. NON-CPI: N2006-057181 [07]
 TITLE: Manufacture of thin film transistor array panel for display device, involves forming photoresist on protection layer on **semiconductor** layer formed on **substrate**, etching layers, and forming passivation layer and pixel electrode
 DERWENT CLASS: A85; L03; P81; U12; U14
 INVENTOR: CHOI T; CHOI T Y; KIM B; KIN H; LEE W; LEE W J;
 LEE Y; LEE Y U; RYU M; RYU M S; KIM B S
 PATENT ASSIGNEE: (CHOI-I) CHOI T; (KIMB-I) KIM B; (LEEW-I) LEE W;
 (LEEY-I) LEE Y; (RYUM-I) RYU M; (SMSU-C) SAMSUNG ELECTRONICS CO LTD
 COUNTRY COUNT: 4

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|--------|-------------|
| US 20050287719 | A1 | 20051229 | (200607)* | EN | 12[11] | H01L021-00 |
| JP 2006005352 | A | 20060105 | (200607) | JA | 11 | |
| CN 1716059 | A | 20060104 | (200638) | ZH | | G02F001-13 |
| KR 2005118359 | A | 20051219 | (200652) | KO | | H01L029-786 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|------------------|----------|
| US 20050287719 | A1 | US 2005-143158 | 20050602 |
| CN 1716059 | A | CN 2005-10076638 | 20050613 |
| JP 2006005352 | A | JP 2005-173156 | 20050614 |
| KR 2005118359 | A | KR 2004-43462 | 20040614 |

PRIORITY APPLN. INFO: KR 2004-43462 20040614

INT. PATENT CLASSIF.:

MAIN: H01L021-00; H01L029-786
 SECONDARY: H01L021-84
 IPC ORIGINAL: G02F0001-13 [I,C]; G02F0001-136 [I,A];
 H01L0021-02 [I,C]; H01L0021-027 [I,A];
 H01L0029-66 [I,C]; H01L0029-66 [I,C];
 H01L0029-786 [I,A]; H01L0029-786 [I,A];
 H01L0051-05 [I,A]

BASIC ABSTRACT:

US 20050287719 A1 UPAB: 20060130

NOVELTY - A gate line and gate insulating layer (140) are formed on **substrate** (110). Data line and drain electrode and subsequently organic **semiconductor** layer (154) are formed. Protection layer and photoresist are sequentially formed. Protection and **semiconductor** layers are etched. Passivation layer (180) having contact holes (181, 182, 185) is formed. Pixel electrode (190) is formed, to manufacture the thin film transistor array **panel**.

DETAILED DESCRIPTION - A gate line and gate insulating layer are sequentially formed on a **substrate**. A data line and a drain electrode are formed on the gate insulating layer. An organic **semiconductor** layer is deposited on the date line, drain electrode and exposed portions of the gate insulating layer. A protection layer is deposited on the **semiconductor** layer. A photoresist having a positive photosensitivity is formed on the protection layer. The protection layer and **semiconductor** layer are etched using the photoresist as an etch mask. A passivation layer having a contact hole exposing a portion of the drain electrode is formed on the protection layer, data line and drain electrode. A pixel electrode is formed on the passivation layer, pixel electrode electrically connected to the drain electrode via the contact hole, to manufacture the thin film transistor array **panel**.

An INDEPENDENT CLAIM is included for thin film transistor array **panel**, which has a gate line and gate insulating layer sequentially formed on a **substrate**, a data line and a drain electrode formed on the gate insulating layer, an organic **semiconductor** formed on a portion of the data line and a portion of the drain electrode, a protective material having same planar shape as the organic **semiconductor**, formed on the organic **semiconductor**, a passivation layer having a contact hole formed on the protective material, a portion of the data line and a portion of the drain electrode, and a pixel electrode formed on the passivation layer.

USE - For manufacturing thin film transistor array **panel** for display devices such as liquid crystal and organic light emitting diode.

ADVANTAGE - The thin film transistor array **panel** is simply manufactured and improves the reliability of thin film transistor.

DESCRIPTION OF DRAWINGS - The figure shows the sectional view of the thin film transistor array **panel**.

- substrate** (110)
- gate electrode (124)
- gate insulation layer (140)
- organic **semiconductor** layer (154)
- source electrode (173)
- passivation layer (180)
- contact holes (181, 182, 185)
- pixel electrode (190)

MANUAL CODE: CPI: A12-E11; L03-G05B6; L04-C06B; L04-C11C;

L04-C12; L04-C13A; L04-E01E

EPI: U12-B03A; U12-B03C; U14-H01A; U14-J02E;

U14-K01A2B

TECH

ELECTRONICS - Preferred Method: Formation of photoresist further involves disposing the photoresist at a portion of the protection layer corresponding to a portion of gate electrode (124) of the gate line, and a portion of a source electrode (173) of the data line. The gate line comprises a gate electrode extended from the gate line and fully covered by the organic **semiconductor**

ORGANIC CHEMISTRY - Preferred Layer: The protection layer is insensitive to light, and comprises aqueous organic material, preferably polyvinyl alcohol. The organic **semiconductor** layer is soluble in an organic solvent. The **semiconductor** layer comprises tetracene, pentacene and its

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derivatives with substituent; oligothiophene including 4-8 thiophenes connected at the positions 2,5 of thiophene rings; perylene tetracarboxylic dianhydride, naphthalene tetracarboxylic dianhydride and its imide derivatives; metallized phthalocyanine and its halogenated derivates; co-oligomer and co-polymer of thienylene and vinylene; regioregular polythiophene; perylene, coronene, and its derivatives with substituent; and/or their aromatic and heteroaromatic ring with one or more 1-30C hydrocarbon chain.
POLYMERS - Preferred Layer: The gate insulating layer comprises silicon dioxide, silicon nitride, maleimide-styrene, polyvinylphenol and/or modified cyanoethylpullulan. The gate insulating layer is surface treated with octadecyl-trichlorosilane.

L113 ANSWER 47 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2005-807576 [82] WPIX
DOC. NO. CPI: C2005-248185 [82]
DOC. NO. NON-CPI: N2005-669460 [82]
TITLE: Semiconductor device as memory device
for e.g. computers comprises polymer dielectric
over substrate and active device
comprising organic semiconductor
material and passive layer
DERWENT CLASS: A89; G06; L03; U12; U13
INVENTOR: LYONS C F
PATENT ASSIGNEE: (ADMI-C) ADVANCED MICRO DEVICES INC; (LYON-I)
LYONS C F
COUNTRY COUNT: 107

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| US 20050224922 | A1 | 20051013 | (200582)* | EN | 11[3] | |
| WO 2005104188 | A2 | 20051103 | (200582) | EN | | |
| GB 2426867 | A | 20061206 | (200680) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|----------------|----------|
| US 20050224922 | A1 | US 2004-817467 | 20040402 |
| WO 2005104188 | A2 | WO 2005-US4680 | 20050211 |
| GB 2426867 | A | WO 2005-US4680 | 20050211 |
| GB 2426867 | A | GB 2006-19093 | 20060928 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|------------|------|-----------------|
| GB 2426867 | A | WO 2005104188 A |

PRIORITY APPLN. INFO: US 2004-817467 20040402

INT. PATENT CLASSIF.:

IPC ORIGINAL: G11C0013-02 [I,A]; H01L0021-02 [N,C];
H01L0021-312 [N,A]; H01L0027-28 [I,A];
H01L0051-05 [N,C]; H01L0051-30 [N,A]
IPC RECLASSIF.: G11C0013-02 [I,A]; G11C0013-02 [I,C]; H01L0021-02
[N,C]; H01L0021-312 [N,A]; H01L0023-58 [I,A];
H01L0023-58 [I,C]; H01L0027-28 [I,A]; H01L0027-28
[I,C]; H01L0029-02 [I,C]; H01L0029-08 [I,A];
H01L0051-05 [N,C]; H01L0051-30 [N,A]; H01L0051-40
[I,A]

BASIC ABSTRACT:

US 20050224922 A1 UPAB: 20060125

NOVELTY - A **semiconductor** device comprises a **substrate** (302); a polymer dielectric (308, 312, 322, 324, 326) over the **substrate**; and active device(s) comprising an organic **semiconductor** material (328) and a passive layer.

USE - As memory device for e.g. computers, appliances, industrial equipment, hand-held devices (e.g. cell phones and other two-way communication devices, personal data assistants, pagers, notebook computers, remote controls, video and audio recorders, radios, small televisions and web viewers, cameras), telecommunications equipment, medical equipment, research and development equipment, transportation vehicles, radar/satellite devices.

ADVANTAGE - The invention provides memory chips and **semiconductor** chips where the coefficients of thermal expansion of two or more of the plastic **substrate**, polymer dielectric, conductive polymers, and organic **semiconductors** are matched to mitigate undesirable effects of temperature changes. It provides memory chips and **semiconductor** chips that are relatively light weight and flexible owing to two or more plastic **substrates**, polymer dielectrics, conductive polymers, and organic **semiconductors**.

DESCRIPTION OF DRAWINGS - The figure shows a cross-sectional view of an integrated circuit device containing organic **semiconductor** devices and polymer dielectrics.

Substrate (302)

N-doped region (304)

N+ doped region (306)

Polymer dielectric (308, 312, 322, 324, 326)

Channel stop implant regions (310)

Polymer memory cell (327)

Organic **semiconductor** material (328)

Electrode (330)

MANUAL CODE: CPI: A12-E07C; G06-D06A; G06-F03C; L04-C12E;

L04-E15

EPI: U12-B03C; U12-D02A; U13-C04B

TECH

ELECTRONICS - Preferred Components: The active device comprises a first and a second electrode (330), a passive layer adjacent the first electrode, and the organic **semiconductor** material adjacent the second electrode.

INORGANIC CHEMISTRY - Preferred Materials: The passive layer comprises copper sulfide, copper-rich copper sulfide, copper oxide, copper selenide, copper telluride, manganese oxide, titanium dioxide, indium oxide, silver sulfide, gold sulfide, iron oxide, cobalt arsenide, or nickel arsenide.

ORGANIC CHEMISTRY - Preferred Materials: The passive layer comprises copper sulfide, copper-rich copper sulfide, copper oxide, copper selenide, copper telluride, manganese oxide, titanium dioxide, indium oxide, silver sulfide, gold sulfide, iron oxide, cobalt arsenide, or nickel arsenide.

POLYMERS - Preferred Materials: The polymer dielectric comprises optionally **fluorinated** polyimide, polysilsesquioxane (e.g. hydrogen polysilsesquioxane, methyl polysilsesquioxane, butyl polysilsesquioxane, and phenyl polysilsesquioxane), optionally **fluorinated** benzocyclobutene (BCB), polyphenylene, polysilazane, polyphenylquinoxaline, copolymers of 2,2-bistrifluoromethyl-4,5-difluoro-1,3-dioxole, perfluoroalkoxy resin, **fluorinated** ethylene propylene, fluoromethacrylate, optionally **fluorinated** poly(arylene ether), **fluorinated** parylene, optionally **fluorinated** poly(p-xylylene), parylene F, parylene N, parylene C, parylene D, amorphous polytetrafluoroethylene, polyquinoline, polyphenylquinoxaline, or polymeric photoresist material. It comprises a self-patternable material. The **semiconductor** device further comprises a conductive polymer. The organic **semiconductor** material comprises polyacetylene, polydiphenylacetylene, poly(t-butyl)diphenylacetylene, poly(trifluoromethyl)acetylene, polybis(trifluoromethyl)acetylene, polybis(t-butyl)diphenylacetylene, poly(trimethylsilyl) diphenylacetylene, poly(carbazole)diphenylacetylene, polydiacetylene, polyphenylacetylene, polypyridineacetylene, polymethoxyphenylacetylene, polymethylphenylacetylene,

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poly(t-butyl)phenylacetylene, polynitro-phenylacetylene,
poly(trifluoromethyl) phenylacetylene,
poly(trimethylsilyl)phenylacetylene, polydipyrilmethane,
polyindoquinone, polydihydroxyindole, polytrihydroxyindole,
furane-polydihydroxyindole, polyindoquinone-2-carboxyl,
polyindoquinone, polybenzobisthiazole, poly(p-phenylene sulfide),
polyaniline, polythiophene, polypyrrole, polysilane, polystyrene,
polyfuran, polyindole, polyazulene, polyphenylene, polypyridine,
polybipyridine, polyphthalocyanine, polysexithiophene,
poly(siliconoxohemiporphyrazine),
poly(germaniumoxohemiporphyrazine), poly(ethylenedioxythiophene),
polymetallocene complex, or polypyridine metal complex. Preferred
Properties: The polymer dielectric has a glass transition
temperature or a melting point of 125-425degreesC and a dielectric
constant below 3.

L113 ANSWER 48 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2005-371247 [38] WPIX
CROSS REFERENCE: 2004-091006; 2004-417964; 2004-460457;
2005-371246; 2005-464924; 2006-593266
DOC. NO. CPI: C2006-151604 [50]
DOC. NO. NON-CPI: N2006-390652 [50]
TITLE: Photovoltaic device e.g. solar cell, has
insulating inorganic nanostructured template
having regular template elements having specific
properties, and charge transfer materials
differing in lowest unoccupied molecular orbital
DERWENT CLASS: A85; E21; L03; U12
INVENTOR: PICHLER K; ROSCHEISEN M; ROSCHEISEN M R; SAGER B;
SAGER B M
PATENT ASSIGNEE: (NANO-N) NANOSOLAR INC
COUNTRY COUNT: 2

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|-----------------|------|----------|-----------|----|-------|------------|
| US 20050098205 | A1 | 20050512 | (200538)* | EN | 20[4] | |
| DE 102005003846 | A1 | 20051027 | (200571) | DE | | H01L051-00 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-----------------|------|-------------|-------------------------|
| US 20050098205 | A1 | CIP of | US 2003-443456 20030521 |
| US 20050098205 | A1 | | US 2004-771250 20040202 |
| DE 102005003846 | A1 | | DE 2005-102005003846 |
| | | 20050127 | |

PRIORITY APPLN. INFO: US 2004-771250 20040202
US 2003-443456 20030521

INT. PATENT CLASSIF.:

MAIN: H01L051-00

SECONDARY: H01L031-0248; H01L031-042

IPC RECLASSIF.: H01L0031-00 [I,A]; H01L0031-00 [I,C]

BASIC ABSTRACT:

US 20050098205 A1 UPAB: 20051222

NOVELTY - A photovoltaic device has inorganic nanostructured template, charge-transfer material (108) coating template leaving additional space, and charge-transfer material (109). Template has template elements having diameter of 1-500 nm and density of 1012-1016 elements/m². Lowest unoccupied molecular orbital (LUMO) or conduction band of material (108) differs from LUMO or conduction band of material (109) by more than 0.2 eV.

DETAILED DESCRIPTION - A photovoltaic device has an insulating inorganic nanostructured template, a charge-transfer material (108) coating the nanostructured template material leaving additional space, and a charge-transfer material (109) filling the additional space. The template has regular template elements having

diameter of 1-500 nm and structure density of 1012-1016 elements/m². The materials (108,109) are volumetrically inter-digitated, and have complementary charge transfer properties with respect to each other. The lowest unoccupied molecular orbital (LUMO) or conduction band of material (108) differs from LUMO or conduction band of material (109) by more than 0.2 eV. The absorbance of material (108 and/or 109) is more than 103/cm at the peak of absorption.

An INDEPENDENT CLAIM is included for formation of photovoltaic device, which involves forming the nano-structured template having template elements, coating one or more walls of template elements with charge transfer material (108), such that additional space is left, and filling the additional space with charge transfer material (109).

USE - E.g. solar cell.

ADVANTAGE - The photovoltaic device has favorable corrosion resistance and leakage resistance, and effectively absorbs light. The photovoltaic device is economical, and efficiently converts incident light to electrical energy.

DESCRIPTION OF DRAWINGS - The figure shows a vertical cross-sectional view of photovoltaic device.

- active layer (101)
- interface layer (104)
- transparent conducting electrode (106)
- optical conductive layer (107)
- charge transfer materials (108,109)
- base electrode (110)
- metal layer (112)

MANUAL CODE: CPI: A12-E11; E05-U01; E05-U03; E21-C; E23-B;
E25-B03; E25-E01; E25-E03; E31-G; E31-P06A;
E34-C02; E35-A; E35-D; L03-E05B
EPI: U12-A02A2X; U12-A02A3; U12-A02A4A

TECH

ELECTRONICS - Preferred Arrangement: The nanostructured template is disposed between a base electrode (110) and a top electrode (106), which are transparent. The charge transfer materials (108,109) are electrically contacted with the base electrode and top electrode, respectively. The materials (108,109) fill space between and/or within the template structures up to a level, which is even with upper surface of the template. The device further has a layer of an electrically conductive material coating one or more walls of the template elements, provided such that electrically conductive material is disposed between nanostructured template and material (108). The charge transfer material (108) is n-type or p-type semiconductor, preferably n-type semiconductor. The material (109) is p-type material. The template elements having one or more elongated structures are in the form of hollow tubes that protrude from the template with spaces between the sidewalls of the tubes. The template is made of aluminum oxide. The elongated structures include one or more tubes, pillars, needles, whiskers or elongated crystals protruding from surface, or one or more openings, pores, or channels formed into or through a layer of material. Materials (108,109) do not extend significantly above the surface of the nanostructured template. An interfacial layer is disposed between materials (108,109), and contains one or more chemicals that can covalently attach to material (108) and change a surface energy and/or bonding trap-state and/or attach to dangling-bonds at an exposed surface of material (108) and/or introduce a dipole layer that may increase the efficiency for charge extraction and/or reduce detrimental charge recombination. A conductive coating is provided on one or more walls of the template elements, such that it is disposed between material (108) and insulating nanostructured template. Preferred Properties: Material (109) has band gap of less than 2 eV. The dominant negative charge carrier energy of material (109) is less than 1 eV or 2 eV of LUMO or conduction band of material (108). The hole energy of material (109) is one or more valence band state of material (108).

INORGANIC CHEMISTRY - Preferred Materials: The material (108) is amorphous silicon or hydrogenated amorphous silicon, cadmium sulfide, cadmium oxide, or copper oxide. Amorphous silicon is thicker at upper portion of nanostructured template and thinner at lower portion of template, and has coating thickness of 1-100 nm. The amorphous silicon is n-doped. The electrically conductive material contains an inorganic or organic material. The inorganic material is copper sulfide and/or conductive oxide. The conductive oxide is tin oxide, indium oxide, fluorinated tin oxide, indium tin oxide, tungsten oxide, titania, zinc oxide, zirconium oxide, lanthanum oxide, copper oxide, niobium oxide, strontium oxide, calcium/titanium oxide, vanadium oxide and/or molybdenum oxide. Material (109) is cadmium selenide, zinc selenide, cadmium telluride, zinc telluride, cadmium-tellurium selenide, copper-indium selenide, copper oxide and/or copper sulfide.

Preferred Method: The coating of the walls of template elements with material (108) is carried out by atomic layer deposition (ALD), plasma-enhanced atomic layer deposition, atomic vapor deposition, sputtering, chemical vapor deposition (CVD), metal-organic chemical vapor deposition (MOCVD), pulsed CVD, metal-organic-vapor-phase epitaxy, plasma enhanced chemical vapor deposition (PECVD) electrochemical deposition, electroless (chemical bath) deposition, evaporation, sputtering, plating, ion-plating, molecular beam epitaxy, sol-gel based deposition, spray pyrolysis, vapor-phase deposition, solvent vapor deposition, metal-organic vapor phase deposition, metal-organic-vapor-phase epitaxy, self-assembly, electro-static self-assembly, melt-filling/coating, electro-deposition, electro-plating, layer-by-layer (LBL) deposition, or liquid phase deposition. A layer of metal is anodized, and nano-structured template is formed. The template is coated with a layer of conductive material, by exposing the template to a reducing agent to reduce an oxide material of a sidewall and/or base of the template elements to provide electrical conduction to sidewall and/or base. Alternately, the layer of metal is partially anodized, such that anodized portion of the layer of metal becomes the template while an unanodized portion serves as electrode. The barrier layer at the bottom of one or more template structures, is then removed. A layer of conducting or semi-conducting material is formed at bottom of one or more template structures.

ORGANIC CHEMISTRY - Preferred Materials: A layer of functionalized 60C is covalently attached with material (108). The organic material of electrically conductive material contains poly-3,4-ethylenedioxy thiophene-polystyrene sulfonic acid (PEDOT-PSS), doped conjugated organic materials, or doped or functionalized fullerenes, e.g., doped 60C fullerene. Functionalized fullerene is 60C-COOH or phenyl-61C-butyric acid methyl ester (PCBM). Materials (108,109) are blended together, and are organic or inorganic materials. Materials (108 and/or 109) contain thiophene-, fluorine- and/or aryl-vinyl-based polymers, poly(phenylene) and its derivative, poly(phenylene vinylene) and its derivative, poly(2-methoxy-5-(2-ethyl-hexyloxy)-1,4-phenylene vinylene (MEH-PPV), poly(para-phenylene vinylene) (PPV), PPV copolymers, poly(thiophene) and its derivative, poly(3-octylthiophene-2,5,-diyl) regioregular, poly(3-octylthiophene-2,5,-diyl) regiorandom, poly(3-hexylthiophene) (P3HT), poly(3-hexylthiophene-2,5-diyl) regioregular, poly(3-hexylthiophene-2,5-diyl) regiorandom, poly(thienylene vinylene) and its derivative, poly(isothianaphthene) and its derivative, tetra-hydro-thiophene precursor and its derivative, poly-phenylene-vinylene and its derivative, organometallic polymer, polymer containing perylene units, poly(squaraine) and its derivative, discotic liquid crystal polyfluorene, poly-fluorene copolymer, polyfluorene-based

copolymer co-polymerized and/or blended with charge transporting compound, tri-phenyl-amine and its derivative, light-absorbing compound, fused thiophene rings and its derivative, or optionally substituted hetero-atom ring compound, pigment, dye, small molecule, or fullerene. The pigment, dye or small molecule is chosen from organic pigment or dye, azo-dye having azo chromophore (-N=N-) linking aromatic group, metal-free phthalocyanine, copper phthalocyanine, zinc phthalocyanine, perylene and its derivative, pentacene and its derivative and precursor, naphthalocyanine, squaraine, merocyanine and their respective derivatives, poly(silane), poly(germinate), 2,9-di(pent-3-yl)-antra(2,1,9-def:6,5,10-d'e'f)diisoquinoline-1,3,8,10-tetrone, or 2,9-bis-(1-hexyl-hept-1-yl)-antra(2,1,9-def:6,5,10-d'e'f)diisoquinoline-1,3,8,10-tetrone. Material (109) is **doped** functionalized fullerene, azafullerene, polymerized fullerene (**doped** or undoped), functionalized polymerized fullerene (**doped** or undoped), carbon nano-tube, dye, ruthenium dye, pigment, organic monomer, oligomer, polymer, tetra-hydro-thiophene precursor polymer and its derivative, poly-phenylene-vinylene and its derivative, or conjugated polymer.

Preferred Layer: The interfacial layer contains 60C, 60C-COOH, fullerene excluding 60C, PCBM, or 60C or other fullerene functionalized with a carboxylic acid moiety. Alternately, interface layer is disposed between material (109) and the transparent electrode, and has barrier layer, an organic material, or a conducting polymer.

L113 ANSWER 49 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2005-371246 [38] WPIX
 CROSS REFERENCE: 2004-091006; 2004-417964; 2004-460457;
 2005-371247; 2005-464924; 2006-593266
 DOC. NO. CPI: C2006-151603 [50]
 DOC. NO. NON-CPI: N2006-390651 [50]
 TITLE: Photovoltaic device e.g. solar cell comprises nano-structured template made from first charge transfer-material, second charge-transfer material coating the wall of template elements leaving additional space and third material in the space
 DERWENT CLASS: A85; E21; L03; Q68; U12
 INVENTOR: PICHLER K; ROSCHEISEN M; ROSCHEISEN M R; SAGER B;
 SAGER B M
 PATENT ASSIGNEE: (NANO-N) NANOSOLAR INC
 COUNTRY COUNT: 2

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|-----------------|------|----------|-----------|----|-------|------------|
| US 20050098204 | A1 | 20050512 | (200538)* | EN | 17[3] | |
| DE 102005003841 | A1 | 20051103 | (200572) | DE | | H01L051-30 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-----------------|-----------|----------------------|----------|
| US 20050098204 | A1 CIP of | US 2003-443456 | 20030521 |
| US 20050098204 | A1 | US 2004-771092 | 20040202 |
| DE 102005003841 | A1 | DE 2005-102005003841 | |
| | 20050127 | | |

PRIORITY APPLN. INFO: US 2004-771092 20040202
 US 2003-443456 20030521

INT. PATENT CLASSIF.:
 MAIN: H01L051-30
 SECONDARY: B81B001-00; B82B003-00; C07C061-00; C07C063-42;

C08G061-00; C09D005-24; H01L031-0256;
H01L031-042; H01L031-06

IPC RECLASSIF.: H01L0031-00 [I,A]; H01L0031-00 [I,C]

BASIC ABSTRACT:

US 20050098204 A1 UPAB: 20051222

NOVELTY - A photovoltaic device comprises a nano-structured template made from **n-type** first charge transfer-material; a **p-type** second charge-transfer material conformally coating at least one wall of the template elements leaving additional space; and a third material in the additional space. The third material is a **p-type** or conducting material that volumetrically interdigitates with the second charge-transfer material.

DETAILED DESCRIPTION - A photovoltaic device comprises a nano-structured template made from **n-type** first charge transfer-material; a **p-type** second charge-transfer material conformally coating at least one wall of the template elements leaving additional space; and a third material in the additional space. The third material is a **p-type** or conducting material that volumetrically interdigitates with the second charge-transfer material. A lowest unoccupied molecular orbital (LUMO) or conduction band of the first charge-transfer material differs from a LUMTO or conduction band of the second charge-transfer material by less than 1 eV. A light absorbance of at least one charge transfer material is greater than 10³/cm at the peak of the absorption spectrum. The nano-structured template has template elements of 1 - 500 nm in diameter with a template element density of 10¹² - 10¹⁶ elements/m².

An INDEPENDENT CLAIM is included for making a photovoltaic device involving
(a) forming a nanostructured template from a first charge-transfer material;
(b) coating the walls of the template elements with a second charge-transfer material in a way that leaves additional space; and
(c) filling the additional space with a third charge-transfer material that includes elongated structures that interdigitate the second charge transfer material.

The second charge-transfer material has complementary charge-transfer properties with respect to the first charge-transfer material.

USE - As photovoltaic device, e.g. solar cells or other devices.

ADVANTAGE - The device is solid-state device that do not contain a liquid electrolyte and thus are subject to significantly fewer leakage and corrosion problems of the type associated with devices using liquid electrolytes. The charge-splitting layer of the device exhibits a three-dimensional topology that is very regular along its length and width, but also along its depth. The device is not dye-sensitized and do not depend entirely on a monolayer of a dye adsorbed to an **n-type** inorganic material as a light absorber and absorb light more effectively and can be more efficient on a volume basis in converting incident light to electrical energy. The device does not use a liquid-based electrolyte or redox chemistry to transport holes away from the light absorbing material. The devices can be produced on large-scale with low-cost.

MANUAL CODE: CPI: A12-E11; E08-B; E21; E23-B; E25-B03;
E25-E01; E25-E03; E31-P06A; E34-D03B; E34-D03C;
E35; L03-E05B; L04-E05D
EPI: U12-A02A2; U12-A02A4A

TECH

ELECTRONICS - Preferred Device: The device further comprises a **base** electrode, a top electrode, at least one plug of material at the tips of the elongated structures and an interfacial layer disposed between the first and second charge-transfer materials.

The third charge-transfer material is in the form of at least one elongated structure that volumetrically interdigitate with the second charge transfer material.

The nanostructured template is disposed between the **base** electrode and top electrode.

The first charge-transfer material is in electrical contact with the **base** electrode and the third charge-transfer material is in contact with the top electrode.

The plugs protect against undesired electrical contact between the third charge-transfer material and the template and/or **base** electrode.

The second charge transfer material coats the template elements up to a level that is substantially even with an upper surface of the template.

The third charge transfer material has a different light absorption range and/or a different highest unoccupied molecular

orbital (HOMO)/LUMO level than the second charge transfer material.

The interfacial layer includes at least one chemical that can covalently attach to the first charge-transfer material and change a surface energy and/or bonding trap-states and/or attach to dangling-bonds at an exposed surface of the first charge-transfer material and/or introduce a dipole layer that may increase the efficiency for charge extraction and/or reduce detrimental charge recombination.

The second charge-transfer material includes at least two complementary charge-transfer materials that are blended together. The template elements are in the form of hollow tubes that protrude from the template with spaces between the sidewalls of the tubes.

The third charge transfer material (e.g. transparent conducting material) conformally coats and interdigitate into the second charge transfer material.

The second and third charge-transfer materials are the same material.

Preferred Components: At least one of the base electrode and top is a transparent electrode.

The first charge-transfer material is an electrically semiconductive or conductive material.

The second charge-transfer material is a p-type semiconducting material.

Preferred Method: Step (a) involves anodizing a layer of metal. The method further involves disposing an interfacial layer between the second and third charge transfer materials; and capping tips of the elongated structures with a short-proofing material. Step (b) involves depositing the second charge transfer material on the walls of the nanostructured template by techniques (M1) selected from electrochemical deposition, electroless (chemical bath) deposition, layer-by-layer deposition, evaporation, sputtering, plating, ion-plating, molecular beam epitaxy, and sol-gel based deposition, spray pyrolysis, vapor-phase deposition, solvent vapor deposition, atomic layer deposition, plasma-enhanced atomic layer deposition, atomic vapor deposition, metal-organic vapor phase deposition, metal-organic-vapor-phase epitaxy, chemical vapor deposition, metal-organic chemical vapor deposition, plasma enhanced chemical vapor deposition, self-assembly, electro-static self-assembly, melt-filling/coating electro-deposition, electro-plating, ion-plating, or liquid phase deposition. Step (c) involves depositing the third charge transfer material by (M1).

INORGANIC CHEMISTRY - Preferred Components: The first, second, or third charge-transfer material includes at least one material selected from titanium oxide, zinc oxide (ZnO), copper oxide, copper sulfide, zirconium oxide, lanthanum oxide, niobium oxide, tungsten oxide, tin oxide, indium tin oxide (ITO), strontium oxide, calcium/titanium oxide, indium oxide, vanadium oxide, zirconium oxide, molybdenum oxide, vanadium oxide, strontium oxide, sodium titanate, potassium niobate, silicon, tungsten oxide, cadmium selenide (CdSe), zinc selenide (ZnSe), cadmium sulfide (CdS), cadmium telluride (CdTe), cadmium selenide (CdSe), cadmium telluride selenide (CdTeSe), CIS, CISe, CIGS (CuInGaSe₂), copper-indium selenide, cadmium oxide, and/or their blends or alloys (preferably the first charge-transfer material includes a transparent conductive oxide, especially titanium oxide or zinc oxide).

ORGANIC CHEMISTRY - Preferred Components: The second and third charge-transfer materials are organic materials (preferably a material selected from optionally substituted hetero-atom ring compounds, pigments, dyes and/or fullerenes, especially pigment, dye or small molecule selected from organic pigments or dyes, azo-dyes having azo chromophores (-N=N-) linking aromatic groups, phthalocyanines including metal-free phthalocyanine, (Hpc), zinc phthalocyanine

(ZnPc), copper phthalocyanine (CuPc), perylenes, naphthalocyanines, squaraines, merocyanines and their derivatives, 2,9-di(pent-3-yl)-anthra(2,1,9-def:6,5,10-d'e'f)diisoquinoline-1,3,8,10-tetrone, 2,9-bis-(1-hexyl-hept-1-yl)-anthra(2,1,9-def:6,5,10-d'e'f)diisoquinoline-1,3,8,10-tetrone, pentacene and/or pentacene precursors or fullerenes, doped fullerenes, functionalized fullerenes, doped functionalized fullerenes, azafullerenes, carbon nanotubes, dyes, ruthenium dyes, pigments, organic monomers and/or oligomers). The third charge-transfer material includes an organic semiconducting material.

The interfacial layer includes at least one material selected from fullerenes, doped fullerenes, functionalized fullerenes, 60C-COOH, doped functionalized fullerenes, azafullerenes, phenyl-61C-butyric acid methyl ester (PCBM), carbon nanotubes, dyes, ruthenium dyes, pigments, organic monomers and/or oligomers (preferably 60C or other fullerenes functionalized with a carboxylic acid moiety).

POLYMERS - Preferred Components: The interfacial layer includes at least one material selected from polymerized fullerenes (doped or undoped), functionalized polymerized fullerenes (doped or undoped), polymers, tetra-hydro-thiophene precursor polymers and their derivatives, poly-phenylene-vinylene and its derivative, conjugated polymers and/or their blends. The second or third charge-transfer materials includes a material selected from thiophene-, fluorine- or aryl-vinyl-based polymers, copolymers or blends, poly(phenylene) or its derivative, poly(phenylene vinylene) or its derivative, poly(2-methoxy-5-(2-ethyl-hexyloxy)-1,4-phenylene vinylene (MEH-PPV), poly(para-phenylene vinylene), (PPV), PPV copolymer, poly(thiophene) and its derivative, poly(3-octylthiophene-2,5-diyl) regioregular, poly(3-octylthiophene-2,5-diyl) regiorandom, poly(3-hexylthiophene) (P3HT), poly(3-hexylthiophene-2,5-diyl) regioregular, poly(3-hexylthiophene-2,5-diyl) regiorandom, poly(thienylenevinylene) or its derivative, poly(isothianaphthene) or its derivative, tetra-hydro-thiophene precursors or their derivatives, poly-phenylene-vinylene or its derivative, organometallic polymers, polymers containing perylene units, poly(squaraines) or its derivative, discotic liquid crystals polyfluorenes, polyfluorene copolymers, polyfluorene-based copolymers and blends, polyfluorene-based copolymers co-polymerized and/or blended with charge transporting compounds, polyfluorene-based copolymers co-polymerized and/or blended with tri-phenyl-amines and/or derivatives, polyfluorene-based copolymers co-polymerized and/or blended with light-absorbing compounds and/or polyfluorene-based copolymers co-polymerized and/or blended with fused thiophene rings and derivatives, poly(silanes), poly(germinates), polymerized fullerenes (doped or undoped), functionalized polymerized fullerenes (doped or undoped), polymers, tetra-hydro-thiophene precursor polymers or their derivatives, poly-phenylene-vinylene or their derivatives and/or conjugated polymers.

The third charge-transfer material is also a transparent conductive material (preferably poly-3,4-ethylenedioxothiophene (PEDOT), PEDOT doped with a dopant PEDOT doped with polystyrene sulfonic acid (PSS), doped 2,2'7,7'-tetrakis(N,N-di-p-methoxy-phenyl-amine)-9,9'-spirobifluorene (doped spiro-MeOTAD), polyaniline doped with a dopant and/or polyaniline doped with a dopant polystyrene sulfonic acid (PSS)).

TITLE: Quinone compound for photosensitive layer of
electrophotographic photoreceptor used for
electrophotographic apparatus is new

DERWENT CLASS: E14; G08; P84; S06; T04

INVENTOR: IMURA K

PATENT ASSIGNEE: (FUJI-N) FUJI DENKI GAZO DEVISE KK

COUNTRY COUNT: 1

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|-------|------------|
| JP 2005024871 | A | 20050127 | (200514)* | JA | 18[6] | G03G005-06 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-----------------|------|----------------|----------|
| JP 2005024871 A | | JP 2003-190021 | 20030702 |

PRIORITY APPLN. INFO: JP 2003-190021 20030702

INT. PATENT CLASSIF.:

MAIN: G03G005-06
SECONDARY: C07C049-683; G03G005-04

BASIC ABSTRACT:

JP 2005024871 A UPAB: 20050708

NOVELTY - Quinone compound (I) is new.

DETAILED DESCRIPTION - Quinone compound of formula (I) is new.

R1-R4 = H, 1-12C alkyl or aryl optionally having substituent;
R5-R7 = 1-12C alkyl or heterocyclic group optionally having substituent chosen from halogen atom, nitro group, 1-6C alkyl, aryl, 1-6C halogenated alkyl group or 1-6C alkoxy group; and

 $m = 0-4$.

INDEPENDENT CLAIMS are also included for:

(1) electrophotographic photoreceptor, which has a photosensitive layer (2) formed on an electroconductive substrate (1). The photosensitive layer contains a charge generating substance and quinone compound of formula (I) as a charge transporting substance; and

(2) electrophotographic apparatus, which has electrophotographic photoreceptor and performs electrical charging process in positive charging process.

USE - As charge transporting substance used for photosensitive layer of electrophotographic photoreceptor used for electrophotographic apparatus (all claimed), such as semiconductor laser printer and copier.

ADVANTAGE - The quinone compound has excellent electron transport property and electrical property. The photosensitive layer containing quinone compound has high sensitivity, and provides excellent electrical property and durability to photoreceptor.

DESCRIPTION OF DRAWINGS - The figure shows a sectional view of mono-layer type electrophotographic photoreceptor. (Drawing includes non-English language text).

electroconductive substrate (1)

photosensitive layer (2)

coating layer (6)

MANUAL CODE: CPI: E06-H; E07-H; E10-F02A1; E23; G06-F06
EPI: S06-A01A1; T04-G04C

TECH

IMAGING AND COMMUNICATION - Preferred Layer: The photosensitive layer is mono-layer type photosensitive layer.

ABEX EXAMPLE - A photo conductor for electrophotography was produced by immersion coating an undercoat layer solution comprising (wt. pts.) Amilan CM 8000(RTM; fusible nylon, Toray Industries, Inc.) (3) and methanol / methylene chloride partially aromatic solvent (5/5) (97) upon an aluminum plate and aluminum element tube. This was dried at 100degreesC for 60 minutes, and the under-coating layer of thickness = 0.3 microns of was formed. Next, on this undercoat layer, immersion coating of a dispersion liquid comprising (wt. pts.) X type non-metal phthalocyanine (drawing 2 in JP,2001-228637,A) (0.3) as

charge generating matter; a triphenylamine compound of formula (HT 1-101) (7) as electron hole transportation matter; a compound shown by formula (I-2) (3) as electronic transportation matter; BHT (RTM; 3,5-G tert-4-hydroxytoluene (1) as anti-oxidant; KF-50 (RTM; Silicone oil, Shin-Etsu Chemical Co., Ltd.) (0.01); Pan light TS 2020 (RTM; Bisphenol Z mold polycarbonate resin, Teijin) (10) as binder resin; and methylene chloride (100) was carried out and dried at 100degreesC for 60 minutes to form a monolayer mold sensitization layer of thickness = 25microns.

L113 ANSWER 51 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2005-081174 [09] WPIX
 DOC. NO. CPI: C2005-028120 [09]
 DOC. NO. NON-CPI: N2005-071405 [09]
 TITLE: Wiring for semiconductor device, e.g.
 display device, comprises metal film containing silver, gold, copper, or alloy of these metals, and self-assembled monolayer formed on metal film
 DERWENT CLASS: L03; U11; U14
 INVENTOR: CHO B; CHO B S; JEONG C; JUNG C O; LEE J; LEE J G; SUNG M; SUNG M M; YANG H; YANG H J
 PATENT ASSIGNEE: (SMSU-C) SAMSUNG ELECTRONICS CO LTD
 COUNTRY COUNT: 106

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|--------|-------------|
| WO 2004109750 | A2 | 20041216 | (200509)* | EN | 40[35] | H01L000-00 |
| KR 2004105975 | A | 20041217 | (200525) | KO | | H01L021-768 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|------------------|------|----------------|----------|
| WO 2004109750 A2 | | WO 2004-KR1381 | 20040610 |
| KR 2004105975 A | | KR 2003-37148 | 20030610 |

PRIORITY APPLN. INFO: KR 2003-37148 20030610

INT. PATENT CLASSIF.:

MAIN: H01L000-00; H01L021-768

BASIC ABSTRACT:

WO 2004109750 A2 UPAB: 20050708

NOVELTY - A semiconductor device wiring comprises a metal film containing silver, gold, copper, or alloy of these metals; and a self-assembled monolayer (SAM) formed on the metal film.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(a) manufacture of semiconductor device wiring by depositing a metal film (20) on a substrate (10), patterning the metal film, and forming SAM (30);

(b) a thin-film panel comprising a gate line formed on a substrate and including a gate electrode, a gate insulating layer formed on the gate line, a semiconductor layer formed on the gate insulating layer, a data line formed at least on the semiconductor layer, a drain electrode at least on the semiconductor layer and separated from the data line, and a SAM formed on at least one of the gate line and data line; and

(c) manufacture of thin-film panel by forming a gate line on a substrate, forming a gate insulating layer on the gate line, forming a silicon layer on the gate insulating layer, forming a data line intersecting the gate line and a drain electrode separated from the data line on the silicon layer or on the gate insulating layer, and forming a SAM on at least one of the gate line and the data line.

USE - For semiconductor device, e.g. display device.

ADVANTAGE - The wiring has low resistance and chemical resistance. It reduces signal delay and prevents corrosion of metal.

DESCRIPTION OF DRAWINGS - The figure shows a sectional view of a semiconductor. Substrate (10)

Metal film (20)
SAM (30)

MANUAL CODE: CPI: L04-C06; L04-C10
EPI: U11-C05C7; U11-D03B2; U14-H01A; U14-H01D

TECH

ELECTRONICS - Preferred Method: Oxides on the metal film are removed before formation of SAM. Formation of SAM includes dipping the metal film into a solution containing HS-(CH₂)_n-X or X-(CH₂)_n-S-S-(CH₂)_n-X.

X=CH₃, CF₃, OH, NH₂, CH=CH₂, CCH₃, Cl, Br, CN, OCH₃, N(CH₃)₂, SO₃H, Si(OCH₃)₃, COOH, COOCH₃, CONH₂, ferrocenyl, biotinyl, 2,2-bipyridyl, tetrathiafulvalene carboxylate, **tetraphenylporphyrin**, or ferrocenylazobenzene

Preferred Components: The thin-film panel comprises a pixel electrode electrically connected to the drain electrode.

METALLURGY - Preferred Materials: The gate line or data line comprises silver, gold, copper, or alloy of these metals.

ORGANIC CHEMISTRY - Preferred Materials: The SAM comprises sulfur and methylene.

L113 ANSWER 52 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2004-640566 [62] WPIX
 CROSS REFERENCE: 2003-256787; 2003-419608; 2003-802823;
 2003-898699; 2004-009670; 2004-020491;
 2004-237292; 2004-640856
 DOC. NO. CPI: C2005-007228 [03]
 DOC. NO. NON-CPI: N2005-018656 [03]
 TITLE: Memory cell for e.g. computers, comprises functional media having a state that changes **based** on migration of electrons or holes when subject to external electric field or light radiation
 DERWENT CLASS: A85; L03; U11; U14
 INVENTOR: KRIEGER J H; YUDANOV N F
 PATENT ASSIGNEE: (KRIE-I) KRIEGER J H; (YUDA-I) YUDANOV N F;
 (ADMI-C) ADVANCED MICRO DEVICES INC
 COUNTRY COUNT: 1

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|--------|------------|
| US 20040159835 | A1 | 20040819 | (200462)* | EN | 20[12] | H01L035-24 |
| US 7026702 | B2 | 20060411 | (200626) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|-----------|----------------|----------|
| US 20040159835 | A1 CIP of | WO 2001-RU334 | 20010813 |
| US 20040159835 | A1 | US 2004-776850 | 20040211 |

PRIORITY APPLN. INFO: US 2004-776850 20040211
WO 2001-RU334 20010813

INT. PATENT CLASSIF.:

MAIN: H01L035-24

IPC ORIGINAL: H01L0031-00 [I,A]; H01L0031-06 [I,A]

BASIC ABSTRACT:

US 20040159835 A1 UPAB: 20060122

NOVELTY - A memory cell (100) comprises a first electrode (104), a functional media (103), and a second electrode (110), in sequence. A state of the functional media changes **based** on a migration of electrons or holes when subject to an external electric field or light radiation. The state indicates the information content.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:

(A) a method of fabricating an organic memory device that operates **based** upon electron-hole movement through a passive layer (106) and an active layer (108), comprising forming a first electrode on a **substrate**, forming the passive layer on the

first electrode, forming the active layer on the passive layer, and forming a second electrode on the active layer; and

(B) a system that operates an organic memory device comprising impedance state changing mechanism, and information containing mechanism based on the impedance state.

USE - For use as memory cells for e.g. computers and other electronic devices such as digital audio players, video players, and digital media devices.

ADVANTAGE - The inventive memory cell has short resistance switch time and low operating voltage. It can be programmed via a desired impedance state induced in the memory cell. The desired impedance state represents bits of information, and does not require a constant power supply or refresh cycles to maintain the desired information.

DESCRIPTION OF DRAWINGS - The drawing shows a schematic diagram of a basic organic memory cell and its various sub-layers.

Memory cell (100)

First electrode(103) Functional media (104)

Passive electrode (106)

Active electrode (108)

Second electrode (110)

MANUAL CODE: CPI: A12-E01; L03-G04A; L04-A04; L04-C10;
L04-C11C
EPI: U11-C18B5; U14-A03B7; U14-A03X; U14-C;
U14-E05B

TECH

ELECTRONICS - Preferred Components: The functional media comprises active layer and/or passive layer. The active layer comprises organic, metal organic, and non-organic material. The active layer comprises electric dipole elements, polymer ferroelectrics clusters, non-organic ferro-electrics, salts, alkalis, acids, and water molecules. The active layer comprises material that can dissociate in electrical field and under light radiation. The functional media comprises porous dielectric material.

Preferred Parameters: The first and second electrodes are 0.01-10 microns thick. The active layer is 0.001-5 microns thick. It is 10-500 times thicker than the passive layer.

Preferred Method: The method further comprises forming the active layer via a chemical vapor deposition process or via a gas phase reaction process, or via a spin coating process or a liquid phase reaction process. A first voltage is applied to the first non-copper electrode and the second electrode, to set an impedance state of the organic memory device, the impedance state representing information content. A second voltage is applied to the first electrode and the second electrode to determine an impedance state of the memory device, the impedance state representing information content.

INORGANIC CHEMISTRY - Preferred Components: The first electrode or the second electrode comprises amorphous carbon. The first electrode or the second electrode comprises optically transparent oxide and/or sulfide material. The material that can dissociate on anions such as iodine, bromine,

chlorine, fluorine, chlorate, aluminum AlCl₄, PF₆, AsF₆, AsF₄, SO₃CF₃, BF₄, BC₁₄, NO₃, POF₄, cyanide, SiF₃, SiF₆, SO₄, CH₃CO₂, C₆H₅CO₂, CH₃C₆H₄SO₃, CF₃SO₃, N(SO₃CF₃)₂, N(CF₃SO₂) (C₄F₉SO₂), N(C₄F₉SO₂)₂, alkylphosphate, organoborate, bis-(4-nitrophenyl)sulfonilimide, and poly(styrene sulfonate) (poly anions). The material that can dissociate on cations such as lithium, sodium, potassium, rubidium, cesium, silver, calcium, magnesium, zinc, iron, copper, hydrogen or ammonia. The porous dielectric material is silicon (Si), amorphous Si,

silicon dioxide (SiO₂), aluminum oxide (Al₂O₃), copper oxide (Cu₂O), titanium dioxide (TiO₂), boron nitride (BN), vanadium oxide (V₂O₃), carbon trinitride (CN₃), ferroelectric materials, and/or barium-strontium titanate ((Ba, Sr) TiO₃).

METALLURGY - Preferred Components: The first electrode or the second electrode comprises tungsten, silver, copper, titanium, chromium, germanium, gold, aluminum, magnesium, manganese, indium, iron, nickel, palladium, platinum, zinc, their alloys, indium-tin oxide, conductive oxides, polysilicon, doped amorphous silicon, metal silicides, and/or various copper

composition alloys. The active layer comprises molecular units with redox-active metals. The redox active metals comprise metallocenes complex and/or polypyridine metal complex.

ORGANIC CHEMISTRY - Preferred Components: The active layer comprises materials of a nitro group, materials of an amino group, cyclopentadienyl, dithiolane, methylcyclopentadienyl, fulvalenediyl, indenyl, fluorenyl, cyclobis(para-quart-p-phenylene), bipyridinium, phenothiazine, diazapyrrenium, benzonitrile, benzonate, benzamide, carbazole, dibenzothiophene, nitrobenzene, aminobenzene-sulfonate, and/or amino benzoate. The active layer comprises aromatic hydrocarbons; organic molecules with donor and acceptor properties, metallo-organic complexes; **porphyrin, phthalocyanine, and hexadecafluoro phthalocyanine.** The organic molecules with donor acceptor properties comprises N-ethylcarbazole, tetrathiotetracene, tetrathiofulvalene, tetracyanoquinodimethane, tetracyanoethylene, cloranol, and/or dinitro-n phenyl. The metallo organic complexes are bisdiphenylglyoxime, bisorthophenylenediimine, or tetraaza-tetramethylannulene.

ORGANIC CHEMISTRY - Preferred Components: The first electrode or the second electrode comprises amorphous carbon. The first electrode or the second electrode comprises optically transparent oxide and/or sulfide material. The material that can dissociate on anions such as **iodine, bromine, chlorine, fluorine, chlorate, aluminum AlCl₄, PF₆, AsF₆, AsF₄, SO₃CF₃, BF₄, BC₁₄, NO₃, POF₄, cyanide, SiF₃, SiF₆, SO₄, CH₃CO₂, C₆H₅CO₂, CH₃C₆H₄SO₃, CF₃SO₃, N(SO₃CF₃)₂, N(CF₃SO₂)₂(C₄F₉SO₂), N(C₄F₉SO₂)₂, alkylphosphate, organoborate, bis-(4-nitrophenil)sulfonilimide, and poly(styrene sulfonate) (poly anions).** The material that can dissociate on cations such as lithium, sodium, potassium, rubidium, cesium, silver, calcium, magnesium, zinc, iron, copper, hydrogen or ammonia. The porous dielectric material is **silicon (Si), amorphous Si, silicon dioxide (SiO₂), aluminum oxide (Al₂O₃), copper oxide (Cu₂O), titanium dioxide (TiO₂), boron nitride (BN), vanadium oxide (V₂O₃), carbon trinitride (CN₃), ferroelectric materials, and/or barium-strontium titanate ((Ba, Sr) TiO₃).**

POLYMERS - Preferred Components: The first electrode or the second electrode comprises conducting polymers, **semiconducting polymers, PEDOT/PSS, polyaniline, polythiophene material, doped** conducting organic polymers, **doped semiconducting** organic polymers, undoped **conducting organic polymers, oligomers, monomers, conducting metal oxides, conducting metal nitrides, conducting metal silicides, semiconducting metal oxides, semiconducting metal nitrides, semiconducting metal silicides, and/or conductive organic polymers.**

The active layer comprises polydiphenylacetylene, poly(t-butyl)diphenylacetylene, poly(trifluoromethyl)diphenylacetylene, polybistrifluoromethyl)acetylene, polybis(t-butylidiphenyl)acetylene, poly(trimethylsilyl)diphenylacetylene, poly(carbazole)diphenylacetylene, polydiacetylene, polyphenylacetylene, polypyridineacetylene, polymethoxyphenylacetylene, polymethylphenyl acetylene, poly(t-butyl)phenylacetylene, polynitro-phenylacetylene, poly(trifluoromethyl)phenylacetylene, poly(trimethylsilyl)pheylacetylene, polydipyrromethane, polyindoquinone, polydihydroxyindole, polytrihydroxyindole, furane-polydihydroxyindole, polyindoquinone-2-carboxyl, polyindoquinone monohydrate, polybenzobisthiazole, and/or poly(p-phenylene sulfide). The active layer comprises polyaniline, polythiophene, polypyrrole, polysilane, polystyrene, polyfuran, polyindole, polyazulene, polyphenylene, polypyridine, polybipyridine, **polypythiocyanine, polysexithiophene, poly(siliconoxohemiporphyrazine), poly(germaniumoxohemiporphyrazine), and/or**

: poly(ethylenedioxythiophene). The active layer comprises organic material such as polyacetylene, polyphenylacetylene, polydiphenylacetylene, polyaniline, poly(phenylene vinylene), polythiophene, **polyporphyrins**, porphyrinic macrocycles, thiol derivatized **polyporphyrins**, polymetallocenes, polyferrocenes, **polyphthalocyanines**, polyvinylenes, and/or polystyroles.

L113 ANSWER 53 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2004-655604 [64] WPIX
 DOC. NO. CPI: C2004-234574 [64]
 DOC. NO. NON-CPI: N2004-518761 [64]
 TITLE: Organic **semiconductor** device for display device, has electrical insulating layer having layer containing electrical insulation material having preset volume resistivity, and layer having insulation material with preset dielectric constant
 DERWENT CLASS: A89; E19; E23; L03; P81; U12
 INVENTOR: KONDO H; TANO T
 PATENT ASSIGNEE: (RICO-C) RICOH KK
 COUNTRY COUNT: 1

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|--------|-------------|
| JP 2004241528 | A | 20040826 | (200464)* | JA | 19[11] | H01L029-786 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|---------------|------|---------------|----------|
| JP 2004241528 | A | JP 2003-27883 | 20030205 |

PRIORITY APPLN. INFO: JP 2003-27883 20030205

INT. PATENT CLASSIF.:

MAIN: H01L029-786
 SECONDARY: G02F001-1368; H01L051-00

BASIC ABSTRACT:

JP 2004241528 A UPAB: 20050531

NOVELTY - An organic **semiconductor** device (10) has an electrode layer (2), an electrical insulating layer (3), an organic **semiconductor** layer (6), and electrode layers (4,5). The layer (6) has a layer (A) containing an electrical insulation material having volume resistivity of more than 106 OMEGA.cm, and a layer (B) containing an electrical insulation material having dielectric constant of 4 or more.

DETAILED DESCRIPTION - An organic **semiconductor** device has a sequential lamination of an electrode layer (2), an electrical insulating layer (3) and an organic **semiconductor** layer (6), on an electrically insulating **substrate** (1). Electrode layers (4,5) are provided between layers (3,6). The layers (4,5) are spaced apart, and the space is covered with layer (6). The layer (6) has a layer (A) containing electrical insulation material having volume resistivity of more than 106 OMEGA.cm, and a layer (B) containing electrical insulation material having dielectric constant of 4 or more. The layers (A and/or B) contain organic electrical insulation material.

An **INDEPENDENT CLAIM** is included for display device, which has the organic **semiconductor** device as a switching element.

USE - For display element (claimed).

ADVANTAGE - The organic **semiconductor** device is operated with low gate voltage, and is economical. The dielectric breakdown in low electric field strength is prevented. The **semiconductor** device provides display device having favorable visibility and low power consumption.

DESCRIPTION OF DRAWINGS - The figure shows the sectional drawing of organic **semiconductor** device.

substrate (1)
 electrode layers (2,4,5)
 electrical insulating layer (3)
 organic **semiconductor** layer (6)

organic semiconductor device (10) MANUAL CODE:
 E21; E22; E23; E24; E25;
 E33; E34; E35; L03-G05; L04-A04; L04-C12E;
 L04-E01E
 EPI: U12-B03C; U12-Q

CPI: A12-E07C; A12-E11;

TECH

POLYMERS - Preferred Material: The electrical insulation material having volume resistivity of more than 106 OMEGA.cm, is chosen from polyethylene, polypropylene, polystyrene, polyisobutylene, polyvinyl chloride, phenol resin, polyamide, polycarbonate, polyethylene terephthalate, polybutylene terephthalate, epoxy resin, polyphenylene sulfide, polyether imide, polyethylene naphthalate, polyether sulfone, polyimide, polytetrafluoroethylene and/or silicone resin.

Preferred Layers: The electrode layers (2,4,5) consists of metals such as chromium, tantalum, titanium, copper, aluminum, molybdenum, tungsten, nickel, gold, palladium, platinum, silver and tin, or heterocyclic-type conductive polymers such as polyphenylene-type conductive polymer, polyacetylene-type conductive polymer, polyparaphenylene and its derivative(s), polypyrrole and its derivative(s), polythiophene and its derivative(s), and polyfuran and its derivative(s), or conductive polymer chosen from ionic conductive polymer such as polyaniline and its derivative(s).

ORGANIC CHEMISTRY - Preferred Material: The electrical insulation material having dielectric constant of 4 or more is chosen from cyanoethyl group-containing compounds such as cyanoethyl cellulose, cyanoethyl hydroxyethyl cellulose, cyanoethyl hydroxypyropyl cellulose, cyanoethyl amylose, cyanoethyl starch, cyanoethyl dihydroxy propyl starch, cyanoethyl pullulan, cyanoethyl glycidol pullulan, cyanoethyl polyvinyl alcohol, cyanoethyl polyhydroxy methylene, cyanoethyl sucrose and cyanoethyl sorbitol, vinylidene type-polymer compounds such as polyvinylidene-fluoride and vinylidene-fluoride-trifluoro ethylene copolymer, and p-vinyl phenol-type polymer compounds such as poly p-vinyl phenol, poly p-vinyl phenol bromine compound, p-vinyl phenol-methyl-methacrylate copolymer, p-vinyl phenol-methacrylic acid-2-hydroxyethyl copolymer, p-vinyl phenol-styrene copolymer, p-vinyl phenol-butyl acrylate copolymer, p-vinyl phenol-acrylic acid-2-hydroxyl ethyl copolymer, p-vinyl phenol-phenyl maleimide copolymer, p-vinyl phenol-maleic acid copolymer and p-vinyl phenol-fumaric acid copolymer. The organic semiconductor layer contains organic semiconductor material chosen from poly-N-vinylcarbazole derivative, poly-gamma-carbazolyl ethyl glutamate derivative, pyrene-formaldehyde condensate and its derivative(s), polyvinyl pyrene, polyvinyl phenanthrene, polysilane, oxazole derivative, oxadiazole derivative, imidazole derivative, monoallyl amine derivative, diarylamine derivative, triaryl amine derivative, stilbene derivative, alpha-phenyl stilbene derivative, benzidine derivative, diaryl methane derivative, triaryl methane derivative, 9-styryl anthracene derivative, pyrazoline derivative, divinylbenzene derivative, hydrazone derivative, indene derivative, indenone derivative, butadiene derivative, pyrene derivative, bis stilbene derivative and/or enamine derivative, and at least one type of organic material chosen from thiophene derivative or pentacene, tetracene, bisazo-type pigment, poly azo-type pigment, triaryl methane series pigment, thiazine-type pigment, oxazin type pigment, xanthene-type pigment, cyanine-type pigment, styryl-type pigment, pyriliium-type pigment, quinacridone-type pigment, indigo-type pigment, perylene-type pigment, polycyclic quinone-type pigment, bis benzimidazole-type pigment, indanthrone-type pigment, squarylium pigment, anthraquinone pigment and/or phthalocyanine-type pigment.

INORGANIC CHEMISTRY - Preferred Material: The electrical insulation material having dielectric constant of 4 or more,

contains inorganic electrical insulation material chosen from barium strontium titanate, barium titanate zirconate, lead titanate zirconate, lead zirconate, barium zirconate, strontium zirconate, calcium zirconate, lead-titanate lanthanum, strontium titanate, barium titanate, lead titanate, calcium titanate, magnesium titanate, barium-fluoride magnesium, bismuth titanate, strontium-titanate bismuth, strontium bismuth tantalate, bismuth tantalite niobate, tantalum pentoxide, titanium dioxide, yttrium trioxide, aluminum oxide, hafnium oxide, silicon nitride, lanthanum trioxide, zirconium oxide, and/or yttrium oxide.

Preferred Arrangement: The layer containing organic electrical insulation material is provided at the side near to **substrate** having flexibility, and both layers (A,B) contains organic electrical insulation material. The **semiconductor** device alternately has sequential lamination of organic **semiconductor** layer, electrical insulating layer and electrode layer (2) on **substrate**. Electrode layers (4,5) are spaced apart, and provided between **substrate** and organic insulating layer, or **semiconductor** layer and organic insulating layer. The **semiconductor** device alternately has sequential lamination of electrode layer (2), electrical insulating layer and organic **semiconductor** layer, on **substrate**. Electrode layers (4,5) are spaced apart, and provided above **semiconductor** layer.

L113 ANSWER 54 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2004-655603 [64] WPIX
 DOC. NO. CPI: C2004-234573 [64]
 DOC. NO. NON-CPI: N2004-518760 [64]
 TITLE: Organic active element for display device, has organic electrical insulating layer containing organic oligomers or organic polymer compounds having preset volume resistivity and dielectric constant
 DERWENT CLASS: A18; A28; A85; E19; E23; L03; U12; U14
 INVENTOR: KONDO H; TANO T
 PATENT ASSIGNEE: (RICO-C) RICOH KK
 COUNTRY COUNT: 1

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|--------|-------------|
| JP 2004241527 | A | 20040826 | (200464)* | JA | 16[10] | H01L029-786 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|---------------|------|---------------|----------|
| JP 2004241527 | A | JP 2003-27882 | 20030205 |

PRIORITY APPLN. INFO: JP 2003-27882 20030205

INT. PATENT CLASSIF.:

MAIN: H01L029-786
 SECONDARY: H01L051-00

BASIC ABSTRACT:

JP 2004241527 A UPAB: 20050531

NOVELTY - An organic active element (10) has organic **semiconductor** layer (6) formed between electrode layers (4,5), and organic electrical insulating layer (3) formed between layer (6) and electrode layer (2). Layer (3) has organic electrical insulation materials (A,B) having volume resistivity larger than 106 ohm.cm and dielectric constant of 5 or more, respectively. Materials (A,B) are organic oligomer or organic polymer compound.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for display device having the organic active element as a switching element.

USE - For display device (claimed) such as organic electroluminescent display device, liquid crystal display and electrophoretic display device.

ADVANTAGE - The organic active element has excellent withstand voltage and high dielectric constant, and enlarges ON/OFF ratio of electric current between source and drain. The element decreases leak electric current, and is inexpensive and operated with low gate voltage. The element provides display device with excellent flexibility, favorable visibility and low power consumption.

DESCRIPTION OF DRAWINGS - The figure shows the sectional drawing of the organic active element.

substrate (1)

electrode layers (2,4,5)

organic electrical insulating layer (3)

organic **semiconductor** layers (6,6a,6b)

organic active element (10) MANUAL CODE:

CPI: A12-E07C; A12-E11C; A12-

E14; E21; E22; E23;

E24; E25; E33; E34; E35; L03-G05B; L03-G05F

EPI: U12-B03A; U12-B03C; U14-K01A2B

TECH

ELECTRONICS - Preferred Element: The organic active element has organic **semiconductor** layer (6b) in the gap formed between the electrode layers (4,5), organic **semiconductor** layer (6a) on the upper **surface** of layer (6b) and a **substrate** (1) on the lower **surface** of layer (2). Alternately, the element has electrode layer (2), organic electrical insulating layer (3) and electrode layers (4,5) provided on the same flat **surface** with a gap, in order on the **substrate**. The element (10) has layer (2), insulating layer (3), **semiconductor** layer (6a), **semiconductor** layer (6b) provided between the electrode layers (4,5), and the **substrate** on the upper **surface** of layers (4,5,6b). Alternately, the element has sequentially the layer (2), organic electrical insulating layer (I), electrode layers (4,5) provided on the same flat **surface** with a gap, organic electrical insulating layer (II), organic **semiconductor** layer and **substrate**.

Preferred Device: The display device has organic active element provided on the flexible **substrate surface**.

POLYMERS - Preferred Material: The organic electrical insulation material (A) is polyethylene, polypropylene, polystyrene, polyisobutylene, polyvinyl chloride, phenol resin, polyamide, polycarbonate, polyethylene terephthalate, polybutylene terephthalate, epoxy resin, polyphenylene sulfide, polyether imide, polyethylene naphthalate, polyether sulfone, polyimide, polytetrafluoroethylene and/or **silicone** resin. The insulation material (B) is cyanoethyl cellulose, cyanoethyl **hydroxyethyl** cellulose, cyanoethyl **hydroxypropyl** cellulose, cyanoethyl amylose, cyanoethyl starch, cyanoethyl dihydroxy propyl starch, cyanoethyl pullulan, cyanoethyl glycidol pullulan, cyanoethyl polyvinyl alcohol, cyanoethyl polyhydroxy methylene, cyanoethyl sucrose, cyanoethyl sorbitol, polyvinylidene fluoride, vinylidene fluoride trifluoro ethylene copolymer, poly p-vinyl phenol, poly p-vinyl phenol **bromine** compound, p-vinyl phenol methylmethacrylate copolymer, p-vinyl phenol-methacrylic acid 2-**hydroxyethyl** copolymer, p-vinyl phenol-styrene copolymer, p-vinyl phenol-butyl-acrylate copolymer, p-vinyl phenol-acrylic acid 2-**hydroxyl** ethyl copolymer, p-vinyl phenol-phenyl maleimide copolymer, p-vinyl phenol-maleic acid copolymer or p-vinyl phenol-fumaric acid copolymer. The electrode layers contain heterocyclic group conductive polymers such as polyphenylene group conductive polymer, polyacetylene group conductive polymer, polyparaphenylene and its derivative(s), polyphenylene vinylene and its derivative(s), polypyrrole and its derivative(s), polythiophene and its derivative(s), polyfuran and its derivative(s) or ionic conductive polymer(s) such as polyaniline and its derivative(s).

ORGANIC CHEMISTRY - Preferred Layer: The **semiconductor** layer contains organic **semiconductor** material(s) and organic material(s). The **semiconductor** material is poly-N-vinylcarbazole derivative, poly gamma-carbazolyl ethyl glutamate derivative, pyrene-formaldehyde condensate and its derivative(s), polyvinyl pyrene, polyvinyl phenanthrene, polysilane, oxazole derivative, oxadiazole derivative, imidazole derivative, monoallyl amine derivative, diarylamine derivative, triaryl amine derivative, stilbene derivative, alpha-phenyl stilbene derivative, benzidine derivative, diaryl methane derivative, triaryl methane derivative, 9-styryl anthracene derivative, pyrazoline derivative, divinylbenzene derivative, hydrazone derivative, indene derivative, indenone derivative, butadiene derivative, pyrene derivative, bis stilbene derivative and/or enamine derivative. The organic material is thiophene derivative, pentacene, tetracene, bisazo group pigment, poly azo group pigment, triaryl methane series pigment, thiazine group pigment, oxazin group pigment, xanthene group pigment, cyanine group pigment, styryl group pigment, pyrylium group pigment, quinacridone group pigment, indigo group pigment, perylene group pigment, polycyclic quinone group pigment, bis benzimidazole indanthrone group pigment, squarylium pigment, anthraquinone pigment and/or **phthalocyanine** group pigment.

INORGANIC CHEMISTRY - Preferred Metal: The electrode layers contain chromium, tantalum, titanium, copper, aluminum, molybdenum, tungsten, nickel, gold, palladium, platinum, silver, tin or polymers.

ABEX EXAMPLE - An aluminum electrode of thickness 70 nm was formed on the **surface** of a glass **substrate** by vacuum deposition. Cyano resin CR-S (cyanoethyl pullulan) (in weight parts) (10), Powder UIP-R (polyimide resin) (30) and mixed solvent (100) of acetone and dimethylformamide were mixed, to obtain a dispersion liquid. The obtained liquid was applied on the electrode, and dried at 120degreesC for 2 hours in nitrogen atmosphere. An organic electrical insulating layer with thickness of 250 nm was formed. The insulating layer had dielectric constant of 6.2, volume resistivity of 5x10³ ohm.cm and withstand voltage of 120 kV/mm. Metal was vacuum-deposited, and two electrode layers were formed on the insulating layer with a gap. Pentacene was vacuum-deposited on the upper **surface** of electrode layers and insulating layer, to form an organic **semiconductor** layer with thickness of 50 nm. An organic active element was obtained. The obtained element produced electric value of 600 muA with gate voltage of 9 V.

L113 ANSWER 55 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2004-229084 [22] WPIX
 DOC. NO. CPI: C2004-090059 [22]
 DOC. NO. NON-CPI: N2004-181153 [22]
 TITLE: **Semiconductor** device for e.g.
 electroluminescent display device, comprises
 organic **semiconductor** layer disposed in
 interval between electrodes and covering part of
 electrodes, and resistance layer having lower
 electrical resistance
 DERWENT CLASS: A85; E24; L03; P81; U14
 INVENTOR: KONDOH H
 PATENT ASSIGNEE: (KOND-I) KONDOH H; (RICO-C) RICOH KK
 COUNTRY COUNT: 33

PATENT INFORMATION:

| PATENT NO | KIND DATE | WEEK | LA | PG | MAIN IPC |
|----------------|-------------|-----------|----|--------|----------|
| EP 1385218 | A1 20040128 | (200422)* | EN | 41[29] | |
| US 20040061141 | A1 20040401 | (200425) | EN | | |
| JP 2005056871 | A 20050303 | (200517) | JA | 32 | |

US 7119366 B2 20061010 (200667) EN
 US 20060284180 A1 20061221 (200701) EN

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|---------------------------|------|----------------|----------|
| EP 1385218 A1 | | EP 2003-15629 | 20030716 |
| JP 2005056871 A | | JP 2003-190877 | 20030703 |
| US 20040061141 A1 | | US 2003-618650 | 20030715 |
| US 7119366 B2 | | US 2003-618650 | 20030715 |
| US 20060284180 A1 Cont of | | US 2003-618650 | 20030715 |
| US 20060284180 A1 | | US 2006-509588 | 20060825 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|-------------------|---------|--------------|
| US 20060284180 A1 | Cont of | US 7119366 B |

PRIORITY APPLN. INFO: JP 2003-190877 20030703
 JP 2002-212685 20020722
 JP 2003-166765 20030611

INT. PATENT CLASSIF.:

IPC ORIGINAL: G02F0001-13 [I,C]; G02F0001-1333 [I,A];
 H01L0029-02 [I,C]; H01L0029-04 [I,A]
 IPC RECLASSIF.: G02F0001-13 [I,C]; G02F0001-1368 [I,A];
 H01L0029-66 [I,C]; H01L0029-786 [I,A];
 H01L0051-05 [I,A]; H01L0051-05 [I,C]; H01L0051-30
 [I,A]; H01L0051-50 [I,A]; H01L0051-50 [I,C]

BASIC ABSTRACT:

EP 1385218 A1 UPAB: 20050906

NOVELTY - **Semiconductor** device (20) comprises gate electrode; insulating layer on gate electrode; first electrode on insulating layer; second electrode on insulating layer at interval with first electrode; organic **semiconductor** layer disposed in interval between electrodes and covering part of electrodes; and first resistance layer formed on organic **semiconductor** layer and having electrical resistance lower than that of organic layer.

DETAILED DESCRIPTION - **Semiconductor** device (20) comprises gate electrode; insulating layer on gate electrode; first electrode on insulating layer; second electrode on insulating layer at interval with first electrode; organic **semiconductor** layer disposed in interval between electrodes and covering part of electrodes; and first resistance layer formed on organic **semiconductor** layer and having electrical resistance lower than that of organic **semiconductor** layer.

INDEPENDENT CLAIMS are also included for:

(a) an electroluminescent display device comprising **semiconductor** devices, and light emitting elements arranged in a matrix manner on a **substrate** and comprising a transparent electrode on the **substrate**, an electroluminescent layer on the transparent electrode and a cathode on the electroluminescent layer, where the first electrode (3) is electrically connected with the transparent electrode;

(b) LCD device comprising **semiconductor** devices; and

(c) a calculating device comprising NOT circuit, NAND circuit, and NOR (sic) circuit each including **semiconductor** device.

USE - For electroluminescent display device, LCD device and calculating device (claimed).

ADVANTAGE - The device can increase the mobility of carriers or reduce the current in the OFF state.

DESCRIPTION OF DRAWINGS - The figure is a sectional view showing a configuration of an active device.

Gate electrode (1)

Insulating layer (2)

First electrode (3)

Second electrode (4)

Organic **semiconductor** layer (5)

First resistance layer (6)

Semiconductor device (20) MANUAL CODE:
 L03B; E08-B;

CPI: A12-E07C; A12-E11C; A12-

TECH

ELECTRONICS - Preferred Parameter: Both a distance from the first electrode to the first resistance layer and a distance from the second electrode to the first resistance layer are shorter than interval between the electrodes.

Preferred Component: One of the electrodes is in contact with the first resistance layer.

The device further comprises a second resistance layer formed at the position between the first resistance layer and the organic **semiconductor** layer, the position between the first electrode and the **semiconductor** layer and/or the position between the second electrode and the organic **semiconductor** layer.

The second resistance layer has an electrical resistance so that carriers on the organic **semiconductor** layer are allowed to tunnel through the second resistance layer when a voltage of predetermined value or more than predetermined value is applied across the second resistance layer.

One of the electrodes and the first resistance layer is in contact with the organic **semiconductor** layer.

An interface between one of the electrodes and the first resistance layer rectified an electrical current.

The first resistance layer is formed to be of **plate**, inter-digital, grating or **disk** shape.

A **substrate** is beneath the gate electrode.

The device also comprises a first power supply conducting a current between the first electrode and the second electrode; and a second power supply applying a voltage to the gate electrode.

POLYMERS - Preferred Material: The organic **semiconductor** layer (5) is formed from poly(N-vinylcarbazole) derivatives, poly(gamma(carbazolylethyl)glutamate) derivatives, poly(vinylphenanthrene) derivatives, polysilane derivatives, oxazole derivatives, oxadiazole derivatives, imidazole derivatives, arylamine derivatives such as monoarylamine derivatives and triarylamine derivatives, benzidine derivatives, diarylmethane derivatives, triarylmethane derivatives, styrylanthracene derivatives, pyrazoline derivatives, divinylbenzene derivatives, hydrazone derivatives, indene derivatives, indenone derivatives, butadiene derivatives, pyrene derivatives such as pyrene-formaldehyde derivatives and poly(vinylpyrene) derivatives, stilbene derivatives such as alpha-phenylstilbene derivatives and bis-stilbene derivatives, enamine derivatives, fluorenone and its derivative, poly(fluorenone) and its derivative, and/or thiophene derivatives such as poly(alkylthiophene).

The first resistance layer (6), the first and second (4) electrodes, and the gate electrode (1) are formed from electrically conductive materials of polyacetylene-based polymers, polyphenylene-based polymers such as poly(para-phenylene) and derivatives and poly(phenylene vinylene) and derivatives, heterocyclic polymers such as polypyrrole and derivatives, polythiophene and derivatives, poly(ethylenedioxothiophene) and derivatives, and polyfuran and derivatives, and/or ionic polymers such as polyaniline and derivatives.

The insulating layer (2) and the second resistance layer are formed from thermoplastic resin such as styrene-based polymer such as copoly(styrene/butadiene), copoly(styrene/acrylonitrile), terpoly(styrene/acrylonitrile/butadiene), copoly(styrene/maleic acid) and copoly(styrene/acrylic acid), polyethylene-based resins such as copoly(ethylene/vinyl acetate) and chlorinated polyethylene, polypropylene, vinyl chloride-based resins such as copoly(vinyl chloride/vinyl acetate) polyester alkyl resins, polyamides, polyurethanes, polycarbonates, polyallylates,

polysulfonates, diallyl phthalate resin, poly(vinylbutyral) resin, polyether resins, polyester resins, acrylic resins, silicone resin, melamine resin, fluorocarbon resins such as perfluoroalkoxy, PTFE, polyvinylidene fluoride, parylene resin, polyimide resins, and/or photo-setting resins such as epoxyacrylates and urethane acrylates.

Preferred Component: The first resistance layer comprises dopant with a low vapor pressure including poly(sulfonic acid), poly(styrenesulfonic acid), naphthalenesulfonic acid and/or alkylnaphthalenesulfonic acid.

ORGANIC CHEMISTRY - Preferred Material: The organic material that comprised the **semiconductor** layer is pentacene, tetracene, bis-azo pigments, tris-azo pigments, thiazine-based pigments, oxazine-based pigments, xanthene-based pigments, cyanine pigments, styryl pigments, pyrilium-based pigments, perylene-based pigments, polycyclic quinone-based pigments, bis(benzimidazole)-based pigments, indanthrone-based pigments, squarylium-based pigments, anthraquinone-based pigments, and/or **phthalocyanine-based** pigments such as copper **phthalocyanine** and **titanylphthalocyanine**.

METALLURGY - Preferred Material: Each of the first electrode, second electrode, and gate electrode is formed chromium (Cr), tantalum (Ta), titanium (Ti), copper (Cu), aluminum (Al), molybdenum (Mo), tungsten (W), nickel (Ni), gold (Au), palladium (Pd), platinum (Pt), silver (Ag) or tin (Sn). The insulating layer the second resistance layer can also be formed of metal oxide produced via oxidation of a **surface** of electrode layer formed from the metal.

Preferred Method: The insulating layer and the second resistance layer are formed from metal oxide film produced by coating and baking a solution obtained via hydrolysis of metal alkoxide of formula M(OR)_n or MR(OP')_{n-1}.

R, R' = organic group such as alkyl and Ph;

M = metal in one of IVA through VIIA, VIII, and IB through VIB groups of the periodic table;

n = ionic valence of meal M.

L113 ANSWER 56 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2003-779003 [73] WPIX

DOC. NO. CPI: C2003-214448 [73]

DOC. NO. NON-CPI: N2003-624324 [73]

TITLE: Negative differential resistance device, used in memory cell to generate such resistance, comprises **substrate** having conductor or **semiconductor** material, and **self-assembled monolayer** disposed on **substrate**

DERWENT CLASS: E19; L03; P73

INVENTOR: CARROLL R L; CREDO G; GORMAN C B

PATENT ASSIGNEE: (CARR-I) CARROLL R L; (CRED-I) CREDO G; (GORM-I) GORMAN C B; (UYNC-N) UNIV NORTH CAROLINA STATE

COUNTRY COUNT: 100

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|---------|------------|
| WO 2003073513 | A1 | 20030904 | (200373)* | EN | 102[15] | H01L029-06 |
| AU 2003216456 | A1 | 20030909 | (200428) | EN | | |
| US 20050253139 | A1 | 20051117 | (200576) | EN | | H01L029-10 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-----------|------|-------------|------|
| | | | |

| | |
|-------------------------------|--------------------------|
| WO 2003073513 A1 | WO 2003-US6095 20030227 |
| US 20050253139 A1 Provisional | US 2002-359946P 20020227 |
| AU 2003216456 A1 | AU 2003-216456 20030227 |
| US 20050253139 A1 | WO 2003-US6095 20030227 |
| US 20050253139 A1 | US 2005-502872 20050404 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|------------------|----------|-----------------|
| AU 2003216456 A1 | Based on | WO 2003073513 A |

PRIORITY APPLN. INFO: US 2002-359946P 20020227
US 2005-502872 20050404

INT. PATENT CLASSIF.:

| | |
|------------|---|
| MAIN: | H01L029-06; H01L029-10 |
| SECONDARY: | B32B015-00; B32B015-04; B32B019-00; G11C011-00; H01L021-8234; H01L035-24 |

BASIC ABSTRACT:

WO 2003073513 A1 UPAB: 20060203

NOVELTY - A negative differential resistance (NDR) device has a **substrate** having conductor or **semiconductor** material; and a **self-assembled monolayer** (SAM) disposed on the **substrate**. The SAM comprises a first electroactive moiety and a spacer moiety, the spacer moiety defining a barrier between the electroactive moiety and the **substrate**.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) preparing the NDR device by disposing the **substrate** on the SAM;

(2) generating NDR by applying voltage to the device; and

(3) a memory cell comprising the NDR device and a switching component, the device comprising a second electrical contact comprising conductor or **semiconductor** material, in which the **substrate** and this second electrical contact define a break junction.

USE - The negative differential resistance device is used in a memory cell to generate NDR (claimed).

ADVANTAGE - The device exhibits at least two NDR peaks in the presence of varying applied voltage.

DESCRIPTION OF DRAWINGS - The figure is a structural schematic of a sample surface probed by a scanning tunneling microscope tip.

MANUAL CODE: CPI: E05-E01; E05-E02; E05-G02; E05-G03; E05-L;
E05-M; E05-N; E06-D02; E06-D04; E06-D18;
E07-D04A; E10-A09B; E10-A15; E10-A20B; E10-B01;
E10-B04; E10-C02; E10-C04; E10-E01U; E10-E02D;
E10-E02U; E10-E03; E10-E04; E31-G; E31-K07;
E31-P03; E31-P06A; E35; E35-A; L03-G04A

TECH

INORGANIC CHEMISTRY - Preferred Materials: The conductor material is gold, silver, copper, nickel, platinum, palladium, indium tin oxide, or yttrium-barium-copper oxide. The **semiconductor** material is silicon, germanium, III-V **semiconductor** or II-VI **semiconductor**.

ORGANIC CHEMISTRY - Preferred Materials: The electroactive moiety consists of ferrocene; galvinol; electroactive coordination compound of copper (I) and/or copper (II); viologen and its derivatives; quinine; anthraquinone; cyanine; **porphyrin**; meso-substituted **porphyrin**; beta-substituted **porphyrin**; multi-**porphyrin** array; bipyridyl complex of ruthenium, osmium, iron, cobalt, and/or nickel; or salen complex of manganese, nickel and/or cobalt.

The spacer moiety is (branched or straight chain) 1-20C alkyl, alkenyl or alkynyl or their substituted versions. The NDR device comprises a linker moiety consisting of thiol; isocyanide; carboxylic acid; sulfonic acid; phosphonic acid; hydroxamic acid; alcohol; amine; monochlorosilane; dichlorosilane; trichlorosilane; monoalkoxysilane; dialkoxysilane; or trialkoxysilane. The spacer moiety is preferably an alkane thiol.

MECHANICAL ENGINEERING - Preferred Components: The SAM has a second linker moiety the same as that of the device. The second electrical contact comprises an evaporated top contact, preferably

a metal contact.

L113 ANSWER 57 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2003-505085 [47] WPIX
 DOC. NO. CPI: C2003-134947 [47]
 DOC. NO. NON-CPI: N2003-401149 [47]
 TITLE: Organic thin film transistor for integrated circuits, has nonfluorinated polymeric layer interposed between gate dielectric and organic semiconductor layer
 DERWENT CLASS: A14; A17; A85; L03; U11; U12
 INVENTOR: BOARDMAN L D; DUNBAR T D; JONES T D; KELLEY T W;
 MUYRES D V; PELLERITE M J; SMITH T P
 PATENT ASSIGNEE: (MINN-C) 3M INNOVATIVE PROPERTIES CO; (BOAR-I)
 BOARDMAN L D; (DUNB-I) DUNBAR T D; (JONE-I) JONES
 T D; (KELL-I) KELLEY T W; (MUYR-I) MUYRES D V;
 (PELL-I) PELLERITE M J; (SMIT-I) SMITH T P
 COUNTRY COUNT: 100

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|-------------|
| WO 2003041185 | A2 | 20030515 | (200347)* | EN | 32[0] | H01L051-20 |
| US 20030102471 | A1 | 20030605 | (200347) | EN | | H01L035-24 |
| EP 1442484 | A2 | 20040804 | (200451) | EN | | |
| AU 2002337959 | A1 | 20030519 | (200464) | EN | | |
| JP 2005509298 | W | 20050407 | (200524) | JA | 29 | H01L029-786 |
| US 6946676 | B2 | 20050920 | (200562) | EN | | H01L051-00 |
| US 20060006381 | A1 | 20060112 | (200605) | EN | | |
| US 20060011909 | A1 | 20060119 | (200607) | EN | | |
| AU 2002337959 | A8 | 20051020 | (200615) | EN | | H01L051-20 |
| KR 2005039731 | A | 20050429 | (200637) | KO | | H01L029-786 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|-----------|-----------------|----------|
| WO 2003041185 | A2 | WO 2002-US33872 | 20021023 |
| US 20030102471 | A1 | US 2001-12654 | 20011105 |
| US 6946676 | B2 | US 2001-12654 | 20011105 |
| US 20060006381 | A1 Div Ex | US 2001-12654 | 20011105 |
| US 20060011909 | A1 Div Ex | US 2001-12654 | 20011105 |
| AU 2002337959 | A1 | AU 2002-337959 | 20021023 |
| AU 2002337959 | A8 | AU 2002-337959 | 20021023 |
| EP 1442484 | A2 | EP 2002-773864 | 20021023 |
| EP 1442484 | A2 | WO 2002-US33872 | 20021023 |
| JP 2005509298 | W | WO 2002-US33872 | 20021023 |
| JP 2005509298 | W | JP 2003-543117 | 20021023 |
| US 20060006381 | A1 | US 2005-227501 | 20050915 |
| US 20060011909 | A1 | US 2005-227547 | 20050915 |
| KR 2005039731 | A | WO 2002-US33872 | 20021023 |
| KR 2005039731 | A | KR 2004-706756 | 20040504 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO | | |
|----------------|------|-----------|---------------|---|
| US 20060006381 | A1 | Div ex | US 6946676 | B |
| US 20060011909 | A1 | Div ex | US 6946676 | B |
| EP 1442484 | A2 | Based on | WO 2003041185 | A |
| AU 2002337959 | A1 | Based on | WO 2003041185 | A |
| JP 2005509298 | W | Based on | WO 2003041185 | A |
| AU 2002337959 | A8 | Based on | WO 2003041185 | A |
| KR 2005039731 | A | Based on | WO 2003041185 | A |

PRIORITY APPLN. INFO: US 2001-12654 20011105

US 2005-227501 20050915
 US 2005-227547 20050915

INT. PATENT CLASSIF.:

MAIN: H01L029-786; H01L035-24; H01L051-00; H01L051-20
 SECONDARY: H01L021-00; H01L021-8238; H01L029-78; H01L027-00
 IPC ORIGINAL: H01L0029-02 [I,C]; H01L0029-08 [I,A]; H01L0051-05
 [I,C]; H01L0051-40 [I,A]

BASIC ABSTRACT:

WO 2003041185 A2 UPAB: 20060119

NOVELTY - An organic thin film transistor comprises a nonfluorinated polymeric layer having a thickness of less than 400Angstrom and interposed between a gate dielectric and an organic **semiconductor** layer.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method of making the organic thin film transistor (OTFT), comprising depositing a gate electrode material on a **substrate**; depositing the gate dielectric on the gate electrode material; applying the nonfluorinated polymeric layer interposed between the gate dielectric and the organic **semiconductor** layer; depositing the organic **semiconductor** layer adjacent to the polymeric layer; and providing a source electrode and a drain electrode contiguous to the organic **semiconductor** layer.

USE - For an integrated circuit (claimed).

ADVANTAGE - The inventive transistor exhibits improvement in one or more transistor properties, e.g. threshold voltage, subthreshold slope, on/off ratio, and charge-carrier mobility. The improvements in device performance enable the production by simpler processing conditions of complex circuits having higher operating speeds than the OTFT made without the polymer layer. The inventive transistor also enables the production of larger circuit elements having comparable performance to devices with very small features. Devices with larger feature sizes can be less expensive as they do not require expensive precision patterning methods.

MANUAL CODE: CPI: A11-B05; A12-E07C; L04-E01E
 EPI: U11-C18A1; U12-B03C; U12-Q

TECH

ELECTRONICS - Preferred Component: The gate dielectric comprises an organic electrically insulating material, optionally capped with an inorganic electrically insulating material. The transistor further comprises a non-participating **substrate**, which is optionally flexible; and gate, source and drain electrodes each independently comprising a material from doped silicon, metal, and/or a conducting polymer. The **semiconductor** layer comprises a vapor-deposited organic **semiconductor**. Preferred Properties: The polymeric layer has a thickness of less than 200Angstrom, or 5-200degreesA. The transistor has at least one property from a threshold voltage of -25-25 volts; a subthreshold slope below 10 volts/decade (absolute value); an on/off ratio of at least 1×10^4 ; a charge-carrier mobility of at least 1×10^{-2} cm 2 /Vs when the **semiconductor** layer comprises a **p-type semiconductor**; a charge-carrier mobility of at least50% greater than a comparison OTFT that lacks the polymeric layer; a charge-carrier mobility of at least0.02 cm 2 /Vs greater than a comparison OTFT that lacks the polymer layer; a charge-carrier mobility of at least0.1 cm 2 /Vs greater than a comparison OTFT that lacks the polymer layer; and a charge-carrier mobility of at least1 cm 2 /Vs greater than a comparison OTFT that lacks the polymeric layer.

ORGANIC CHEMISTRY - Preferred Component: The organic **semiconductor** layer comprises a material from acenes, perylenes, fullerenes, **phthalocyanines**, or oligothiophenes; anthracene, tetracene, pentacene, or a substituted pentacene; copper (II) **hexadecafluorophthalocyanine**; or sexithiophene.

POLYMERS - Preferred Material: The polymer layer comprises a material from a polymeric layer derived from monomeric precursors, monomers and oligomers comprising an aromatic-functional segment; a polymer layer derived from a ring-opening polymerization; and/or a polymeric layer comprising a polymer having 50-100% interpolymerized units of formula (I): -C(R1)(R2)-C(R2)H- and 0-50% interpolymerized units of formula (II): -C(X)(R2)-C(R2)H-. The polymeric layer comprises polyarylene, or a non-polar polymer

having a glass transition temperature above 25degreesC; a parylene or polyfluorene; a polymer or copolymer having phosphonic acid end groups, phosphonate end groups, phosphate end groups, or silyl-containing end groups; or a polymer having functional end-groups from phosphorus oxychloride, mercaptopropyltrialkoxysilanes, chlorotrialkoxysilanes, or tetrachlorosilane. The polyarylene is derived from heating a composition comprising cyclopentadienone and acetylene-substituted materials. The polymer comprises a material from norbornene, 4-10C cyclic alkenes or cyclic non-conjugated dienes, any of which may be substituted with one or more 1-20C aliphatic groups or arylalkyl groups and which may contain one or more heteroatoms and/or one or more functional groups. It comprises a material from polystyrene, poly(1-hexene), poly(methyl methacrylate), poly(acenaphthylene), poly(vinyl naphthalene), poly(butadiene), or poly(vinyl acetate).

R1, R2 = H, 1-20C aliphatic, Cl, Br, carboxy, acyloxy, nitrile, amido, alkoxy, carboalkoxy, aryloxy, **chlorinated** aliphatic, **brominated** aliphatic, 6-20C aryl, 7-20C arylalkyl, or **hydroxy** when different R1; and X = heteroatoms(s) and/or functional group(s).

Each X, independently, comprises a functional group capable of bonding to the gate dielectric. Any combination of at least two R1, R2 and/or X groups may together form a cyclic or polycyclic aliphatic, aromatic or polycyclic aromatic.

INORGANIC CHEMISTRY - Preferred Material: The inorganic electrically insulating material is strontiates, tantalates, titanates, zirconates, aluminum oxides, **silicon** oxides, tantalum oxides, titanium oxides, **silicon** nitrides, barium titanate, barium strontium titanate, barium zirconate titanate, zinc selenide, zinc sulfide, or their alloys, combinations or multilayers.

L113 ANSWER 58 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2004-041163 [04] WPIX
 DOC. NO. CPI: C2004-016604 [04]
 DOC. NO. NON-CPI: N2004-033360 [04]
 TITLE: Semiconductor memory cell for semiconductor memory device, comprises field-effect transistor device forming access device and having channel region consisting of organic semiconductor material and gate electrode configuration
 DERWENT CLASS: A85; E19; L03; U13; U14
 INVENTOR: DEHM C; HALIK M; HANEDER T; KLAUK H; MIKOLAJICK T; SCHMID G
 PATENT ASSIGNEE: (DEHM-I) DEHM C; (HALI-I) HALIK M; (HANE-I) HANEDER T; (INFN-C) INFINEON TECHNOLOGIES AG; (KLAU-I) KLAUK H; (MIKO-I) MIKOLAJICK T; (SCHM-I) SCHMID G
 COUNTRY COUNT: 2

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|--------|-------------|
| US 20030178660 | A1 | 20030925 | (200404)* | EN | 18[14] | H01L027-108 |
| DE 10212962 | A1 | 20031016 | (200404) | DE | | H01L051-20 |
| US 6787832 | B2 | 20040907 | (200459) | EN | | H01L029-76 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|------------------|----------|
| US 20030178660 | A1 | US 2003-395457 | 20030324 |
| DE 10212962 | A1 | DE 2002-10212962 | 20020322 |

PRIORITY APPLN. INFO: DE 2002-10212962 20020322

INT. PATENT CLASSIF.:

MAIN: H01L027-108; H01L029-76; H01L051-20

SECONDARY: G11C011-21; H01L029-94; H01L031-062; H01L031-113;
H01L031-119; H01L051-30

BASIC ABSTRACT:

US 20030178660 A1 UPAB: 20050527

NOVELTY - A **semiconductor** memory cell comprises:(i) a field effect transistor device forming an access device and having two source/drain regions, channel region consisting of organic **semiconductor** material between the two source/drain regions, and gate electrode configuration; and

(ii) storage capacitor having a ferroelectric storage dielectric and at least one electrode forming a first gate electrode of the gate electrode configuration.

USE - **Semiconductor** memory device (claimed).

ADVANTAGE - Information can be stored in non-volatile form, and the memory cell can be accessed without any change to the information or loss of information.

DESCRIPTION OF DRAWINGS - The figure is a sectional side view of the **semiconductor** memory cell.

Gate electrode (G1)

Channel region (K)

Source and drain regions (SD1, SD2)

FET device (T)

MANUAL CODE: CPI: A12-E07B; A12-E07C; E05-L03B; E08-B;
 E08-C01; E08-D02; E31-P03; E31-P06D; E34-C02;
 E35-C; E35-J; E35-K04; E35-L; E35-M; E35-N;
 L04-C11C1; L04-C11C2; L04-C14A; L04-E01A
 EPI: U13-C04B1A; U14-A03B4

TECH

ELECTRONICS - Preferred Components: The gate electrode configuration includes a selection gate electrode for selectively switching the field effect transistor (FET) device (T) on and off in a defined and controlled manner without influencing a storage dielectric of the storage capacitor and/or independently of the first gate electrode (G1). The first gate electrode and the selection gate electrode are arranged at a very small lateral spacing distance from one another laterally. With reference to a first direction, the first gate electrode and the selection gate electrode are arranged vertically offset with respect to one another.

The selection gate electrode is formed on a side of one of an insulation region facing the channel region (K) and the source and drain regions (SD1, SD2), and the selection gate electrode is electrically insulated. The insulation regions are formed of silicon dioxide, silicon nitride, aluminum, oxide, zinc oxide and/or hafnium oxide. The **semiconductor** memory cell comprises a **substrate** carrying the field-effect transistor device and the storage capacitor, the **substrate** being formed of metal, plastic or paper. The metal is copper, nickel, gold or iron/steel. The **semiconductor** memory cell comprises insulation regions comprising inorganic and/or organic substance.

POLYMERS - Preferred Materials: The organic material for ferroelectric storage dielectric is a material consisting of polymeric ferroelectric based on fluorinated polyenes, polyvinylidene difluoride (PVDF), polytrifluoroethylene (PTFE) and/or their copolymers or terpolymers.

The insulation regions and the **substrate** each consist of polymers such as polystyrene, polyethylene, polyester, polyurethane, polycarbonate, polyacrylate, polyimide, polyether and/or polybenzoxazoles.

ORGANIC CHEMISTRY - Preferred Materials: The organic material for the channel comprises a **p-type** **semiconductor** based on condensed aromatic compounds, polythiophenes, polypyroles or organometallic complexes of phthalocyanine or porphyrin. The condensed aromatic compounds are anthracene, tetracene or pentacene, the polythiophenes being poly-3-alkylthiophenes or

polyvinylthiophenes, and the organometallic complexes of phthalocyanine or porphyrin being formed with copper.

L113 ANSWER 59 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2003-271701 [27] WPIX
 DOC. NO. CPI: C2003-071984 [27]
 DOC. NO. NON-CPI: N2003-215460 [27]
 TITLE: Packaging material for containers, has electroconductive cross-linkable layer containing composition of water-soluble conductive polymer, solvent, silane coupling agent and polymer compound
 DERWENT CLASS: A85; E11; L03; P73; Q34
 INVENTOR: SAITO T; UZAWA M
 PATENT ASSIGNEE: (MITR-C) MITSUBISHI RAYON CO LTD
 COUNTRY COUNT: 1

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|-------|------------|
| JP 2003025508 | A | 20030129 | (200327)* | JA | 18[0] | B32B027-00 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-----------------|------|----------------|----------|
| JP 2003025508 A | | JP 2001-211805 | 20010712 |

PRIORITY APPLN. INFO: JP 2001-211805 20010712

INT. PATENT CLASSIF.:

| | |
|------------|--|
| MAIN: | B32B027-00 |
| SECONDARY: | B32B027-18; B65D065-40; B65D073-02; B65D085-86; C09D165-00; C09D179-02; C09D183-04; C09D201-00; C09D201-02; C09D005-24 |

BASIC ABSTRACT:

JP 2003025508 A UPAB: 20050528

NOVELTY - A water-proof electroconductive packaging material has cross-linkable electroconductive laminate formed by applying and/or impregnating cross-linkable electroconductive composition on **surface(s)** of **base** material. The composition contains water-soluble conductive polymer having sulfonic acid group and/or carboxyl group, solvent, silane coupling agent and polymer compound.

DETAILED DESCRIPTION - A water-proof electroconductive packaging material has a cross-linkable electroconductive laminate formed by applying and/or impregnating cross-linkable electroconductive composition on **surface(s)** of **base** material. The composition contains water-soluble conductive polymer having sulfonic acid group and/or carboxyl group, solvent, silane of formula (1) and a polymer compound chosen from water-soluble polymer and which forms an emulsion in water.

R43-R45 = hydrogen, 1-6C alkyl, 1-6C alkoxy, amino, acetyl, phenyl and halogen;
 X = group formula (A or B);
 n, m = 1-6; and
 Y = **hydroxyl**, thiol, amino and epoxy(cyclohexyl).

An INDEPENDENT CLAIM is included for a container for electronic component, which has the packaging material.

USE - For containers for electronic components (claimed) such as tray, carrier tape, cover tape, packaging bags, magazine bulk case, electronic office equipment cover, for storage of electronic material such as integrated circuit, large scale integration, **semiconductor** device, liquid crystal display, plasma display, **silicon wafer**, hard disk, liquid crystal **substrate**, magnetic disk, optical device, magneto-optical device and electronic component for conveyance and mounting.

ADVANTAGE - The water-soluble conductive polymer having sulfonic acid group and carboxyl group is not impaired by heat processing at normal temperature, and the packaging material does not have humidity dependence and has high electroconductivity. The water-proof electroconductive packaging material has excellent film-forming property, moldability, transparency, adhesion, water-resistance, hardness and concealment property. The packaging material has beautiful coating property. MANUAL CODE: CPI: A08-M01D; A09-A03; A12-

P01; E05-E01;

E05-E02; L03-A02D; L03-D05A

TECH

POLYMERS - Preferred Composition: The packaging material further contains colloidal silica and coloring agent chosen from dye or pigment. Preferred Polymer: The water-soluble conductive polymer having sulfonic group and/or carboxyl group contains monomer units chosen from group of formulae (2-6). The conductive polymer contains 20-100% of total of monomer units, based on whole of the polymer.

R1-R13 = H, -SO₃-, -SO₃H, -R35SO₃-, -R35SO₃H, -OCH₃, -CH₃, -C₂H₅, -F, -Cl, -Br, -I, -N(R35)₂, -NHCO₃5, -OH, -O-, -SR35, -OR35, -OCOR35, -NO₂, -COOH, -R35COOH, -COOR35, -COOR35, -CHO, and -CN, preferably -SO₃-, -SO₃H, -R35SO₃-, -R35SO₃H, -COOH, or -R35COOH; and

R35 = 1-24C alkyl, aryl, aralkyl, or (ar)alkylene.

The conductive polymer preferably contains monomer unit of formula (7 and 8).

R15-R32 = same as R1-R13;

R33 = sulfonic acid, carboxyl groups or their metal salts and optionally substituted ammonium salt;

R34 = methyl, ethyl, n-, iso-propyl, n-, iso-, sec-, t-butyl, dodecyl, tetracosyl, methoxy, ethoxy, n-propoxy, iso-, sec-, t-butoxy, heptoxy, hexoxy, octoxy, dodecoxy, tetracosyloxy, fluoro, chloro and bromo;

X = 0-1; and

n = 3 or more.

The water-soluble conductive polymer is obtained by polymerizing acidic group substituted aniline of formula (9), or alkoxy substituted amino benzene sulfonic acid and their alkali metal salt and optionally substituted ammonium salt using oxidizing agent in solution of basic compound.

R36-R41 = same as R1-R13.

The high molecular polymer compound is chosen from water-soluble high molecular compound such as aqueous acrylic resin, aqueous polyester resin, aqueous urethane resin and/or aqueous chlorinated polyolefin resin. Preferred Properties:

Colloidal silica has particle diameter of 1-300 nm and coloring agent is water-soluble and/or dispersible. The packaging material has **surface** resistance value of 105-1012 ohms at 25degreesC and at relative humidity of 15%. The variation rate (SR1/SR0) of the packaging material is 5 or less, at 40degreesC for 1 hour, where SR1 is **surface** the resistance value after immersing in pure water at 40degreesC for 1 hour and SR0 is the **surface** resistance value of unprocessed material, variation rate (SR2/SR0) is 10 or less, where SR2 is **surface** resistance value after expanding the layer to 150% and variation rate (SR3/SR0) 10 or less, where SR3 is the **surface** resistance value after casting. Visible ray transmittance of packaging material is 70% or more

ABEX EXAMPLE - Poly(2-sulfo-5-methoxy-1,4-iminophenylene) combined 2-aminoanisole-4-sulfonic acid (100 mmol) was dissolved in aqueous ammonia (4 mol/L) at 25degreesC. An aqueous solution of ammonium peroxy disulfate (100 mmol) was added to the mixture. The resulting mixture was stirred at 25degreesC for 12 hours and resulting product was dried, and polymer powder (15 g) having volume resistivity of 9 ohm cm was prepared. The prepared polymer (in mass parts) (0.15), gamma-glycidyl oxypropylmethyl diethoxysilane (0.05), colloidal silica (5) having particle diameter of 10 nm, aqueous emulsion of acrylic resin (2.5) and copper **phthalocyanine** blue (0.1), were dissolved in water (100) at room temperature, and a cross-linkable electroconductive composition was prepared. The prepared composition was applied on a polyethylene terephthalate sheet and dried for 5 minutes at 80degreesC, and a cross-linkable electroconductive layer was formed. The formed layer had **surface** resistance value (SR0) of 7.2x10⁸ ohms,

surface resistance value (SR1) after immersing the layer in pure water at 40degreesC for 1 hour of 7.2x10⁸ ohms and surface resistance value (SR2) after expanding of 2.1x10⁹ ohms. The layer had visible transmittance of 98%, variation rate (SR1/SR0) of 1 and SR2/SR0 of 2.9. The layer had excellent blocking resistance.

L113 ANSWER 60 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2003-167236 [16] WPIX
 DOC. NO. CPI: C2003-043372 [16]
 DOC. NO. NON-CPI: N2003-132222 [16]
 TITLE: Electrochemical method for repairing or preventing defects in molecular layer, involves electrochemically oxidizing/reducing soluble molecule by applying potential at level less than that which decomposes layer
 DERWENT CLASS: A85; E14; L03; U11
 INVENTOR: ALLARA D L; KASCHAK D M; MALLOUK T E
 PATENT ASSIGNEE: (MOLE-N) MOLECULAR ELECTRONICS CORP
 COUNTRY COUNT: 98

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|-------|------------|
| WO 2002095810 | A1 | 20021128 | (200316)* | EN | 32[0] | H01L021-00 |
| AU 2002310071 | A1 | 20021203 | (200452) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|---------------|------|-----------------|----------|
| WO 2002095810 | A1 | WO 2002-US16321 | 20020521 |
| AU 2002310071 | A1 | AU 2002-310071 | 20020521 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|---------------|------|-----------------|
| AU 2002310071 | A1 | Based on |
| | | WO 2002095810 A |

PRIORITY APPLN. INFO: US 2001-292749P 20010521

INT. PATENT CLASSIF.:

MAIN: H01L021-00

BASIC ABSTRACT:

WO 2002095810 A1 UPAB: 20050528

NOVELTY - Providing alternative method for filling, repairing or preventing voids and defects in a molecular layer.

DETAILED DESCRIPTION - A soluble molecule comprising a polymer precursor is electrochemically oxidized or reduced to a polymeric form, by dissolving the soluble molecule in an electrolyte solution, immersing the conductive substrate bearing a 0.3-100 nm thick molecular layer in the solution, and applying an appropriate potential to electropolymerize the molecule. The application of potential, which is at a level less than that which would cause oxidative desorption or decomposition of the molecular layer, is terminated when the current attributed to the oxidation or reduction of the soluble molecule falls to 2% or less of its peak value.

An INDEPENDENT CLAIM is included for method of measuring film quality of a molecular layer, which involves electrochemically oxidizing or reducing a soluble molecule to a polymeric form, and imaging the deposits of polymer to assess the number of defects or voids.

USE - For filling, repairing or preventing voids and defects in a molecular layer adsorbed on an electronically conductive substrate e.g. defects in electronic devices encompassing optical, alternate logic, and molecular memory devices.

ADVANTAGE - The method prevents short circuits, decreases leakage currents, increases device and circuit durability, and increases yields in device fabrication for memory and logic applications. The electropolymerization method covers defects in thin molecular layers which would otherwise lead to device short circuits or electron tunneling

pathways. The method is self-limiting, hence the electropolymerization reaction slows down or stops when the exposed metal area is covered. MANUAL CODE: CPI: A11-C; A12-E07; E07-D04A; E07-D04C;

E10-B01A; E10-B03A; E10-B04A2; E10-E02U;
E10-E04M1; E10-J02B4; L04-C10; L04-C18; L04-E06
EPI: U11-C03J2

TECH

METALLURGY - Preferred Substrate: The conductive substrate is a conductive metal substrate or a non-metallic conductive substrate chosen from copper, gold, silver, palladium, platinum and aluminum. The non-metallic conductive substrate is a doped semiconductor chosen from copper, gold, silver, palladium, platinum, aluminum, n-type silicon, p-type silicon, polysilicon, amorphous silicon, gallium arsenide, gallium arsenide phosphide and germanium.

POLYMERS - Preferred Substrate: The non-metallic conductive substrate is a conducting polymer chosen from poly(pyrrole), poly(aniline) and poly(thiophene).

Preferred Layer: The molecular layer is chosen from self-assembled or physisorbed organic monolayers, adsorbed polymer layers, crystalline or amorphous films of monomeric organic molecules, and films composed of inorganic particles.

The self-assembly physisorbed organic monolayers are about 0.5-4 nm thick, the adsorbed polymer layers are 0.5-50 nm thick, the crystalline or amorphous films of monomeric organic molecules are 0.3-100 nm thick and the films composed of inorganic particles are 1.5-100 nm thick.

Preferred Precursor: The polymer precursor is chosen from 1,2-diaminobenzene, aniline, and aminonaphthalene derivatives, and preferably aromatic amines in which the aromatic ring contains at least one other electron-donating group chosen from amino, hydroxy, alkoxy, aromatic amines, aromatic alcohols, N-alkyl pyridium salts, vinylbenzene and vinylpyridine.

ORGANIC CHEMISTRY - Preferred Layer: The molecular layer is a self-assembled monolayer made from aliphatic and aromatic monolayer-forming molecules which contain terminal thiol, disulfide, carboxylate, isonitrile, amine, hydroxamate, phosphate, phosphonate, alkoxy silane, halosilane groups, free radicals or aryl halides which can be covalently coupled to a surface of the metal substrate.

INORGANIC CHEMISTRY - Preferred Film: The inorganic molecular film is a metal phosphonate, metal-cyanide network, metallocene, metalloporphyrin or metallophthalocyanine.

The inorganic nanoparticle film is made of metal nanoparticles, carbon nanoparticles, semiconducting oxides chosen from titania, zinc oxide and tin oxide, and 13-15 semiconductors chosen from gallium arsenide and indium phosphide. The chalcogenides are cadmium selenide, cadmium telluride, molybdenum sulfide and/or tungsten sulfide.

ELECTRONICS - Preferred Properties: The process is terminated when the anodic current attributed to oxidation of 1,2-diaminobenzene falls to 0.1% or less of its peak value.

ABEX SPECIFIC COMPOUNDS - The soluble molecule is 1,2-diaminobenzene.

EXAMPLE - A 1-10 millimolar solution of 1,2-diaminobenzene was made in acetonitrile solvent by mixing the compound with the solvent at ambient temperature, and adding a sufficient quantity of an electrolyte salt such as tetra(n-butylammonium) perchlorate to make a 0.1 M solution. A metal substrate coated with self-assembled monolayer of molecule of formula (I) was immersed in the solution and used as the working electrode of an electrochemical cell which also contained a platinum auxiliary electrode and a saturated calomel electrode. The electrode was cycled at 50 mV/second for 10-20 cycles. The

potential was chosen to be sufficiently positive to oxidatively polymerize 1,2-diaminobenzene at exposed areas of the working electrode. The process was start when the anodic current attributed to oxidation of 1,2-diaminobenzene fell to 0.1% of its peak value in the first cyclic voltammetric sweep anodic half-cycle of the process. The working electrode was then returned to 0 V and removed from the solution, rinsed twice with acetonitrile, and dried in a stream of inert gas. When examined by cyclic voltammetric in an aqueous solution of potassium ferrocyanide (K4Fe(CN)6), the oxidation-reduction current normally attributed to grain boundary defects or pinholes in the monolayer was significantly suppressed. The electrochemically generated polymer was formed in areas where the metal was exposed to the solution and was adsorbed in such a way as to cover the exposed metal surface. The process was self-limiting and hence the electropolymerization reaction slowed-down or stopped when the exposed metal area was covered. -
Ac = CH3CO.

L113 ANSWER 61 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2002-566805 [60] WPIX
 DOC. NO. CPI: C2002-160757 [60]
 DOC. NO. NON-CPI: N2002-448642 [60]
 TITLE: Semiconductor device to detect nitric oxide in biological fluids, has conducting semiconductor layer, (semi)-insulating layer, layer of multi-functional organic molecules capable of binding oxide, and conducting pads
 DERWENT CLASS: B04; D15; E19; E36; J04; L03; S03
 INVENTOR: BENSHAFRUT A; CAHEN D; HARAN A; NAAMAN R; SHVARTS D; WU D
 PATENT ASSIGNEE: (BENS-I) BENSHAFRUT A; (CAHE-I) CAHEN D; (HARA-I) HARAN A; (NAAM-I) NAAMAN R; (SHVA-I) SHVARTS D; (WUDD-I) WU D; (YEDA-C) YEDA RES & DEV CO LTD
 COUNTRY COUNT: 99

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|------------|
| WO 2002057738 | A2 | 20020725 | (200260)* | EN | 39[7] | G01N000-00 |
| EP 1358461 | A2 | 20031105 | (200377) | EN | | G01N001-00 |
| US 20040072360 | A1 | 20040415 | (200426) | EN | | G01N027-02 |
| AU 2002226645 | A1 | 20020730 | (200427) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|----------------|----------|
| WO 2002057738 | A2 | WO 2002-IL45 | 20020117 |
| AU 2002226645 | A1 | AU 2002-226645 | 20020117 |
| EP 1358461 | A2 | EP 2002-716275 | 20020117 |
| EP 1358461 | A2 | WO 2002-IL45 | 20020117 |
| US 20040072360 | A1 | WO 2002-IL45 | 20020117 |
| US 20040072360 | A1 | US 2003-250992 | 20031124 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|---------------|------|-----------------|
| EP 1358461 | A2 | Based on |
| AU 2002226645 | A1 | WO 2002057738 A |
| | | WO 2002057738 A |

PRIORITY APPLN. INFO: IL 2001-140949 20010117

INT. PATENT CLASSIF.:

MAIN: G01N000-00; G01N001-00; G01N027-02

BASIC ABSTRACT:

WO 2002057738 A2 UPAB: 20050526

NOVELTY - Semiconductor (SC) device comprises conducting SC layer(s) (2), (semi)-insulating layer(s) (1), a multifunctional organic molecule layer (4) capable of binding nitric oxide (NO), which is directly bound to layer (1 or 2), and two conducting pads (3) on top layer.

DETAILED DESCRIPTION - Semiconductor (SC) device comprises conducting SC layer(s) (2), (semi)-insulating layer(s) (1), a multifunctional organic molecule layer (4) capable of binding nitric oxide (NO), which is directly bound to layer (1 or 2), and two conducting pads (3) on top layer. (3) make electrical contact with an electrically conducting layer, such that current flows between them at a finite distance from device surface.

INDEPENDENT CLAIMS are included for:

(1) array of **semiconductor** device having each device covered with a **monolayer** of different nitric oxide (NO) binding molecules; and

(2) method for detecting and measuring NO which involves exposing the **semiconductor** device or an array of device to sample containing NO, monitoring the presence of NO in sample and determining NO concentration based on the change in current measured at constant electric potential applied between two conducting pads.

USE - For detecting NO in biological fluids such as endogenous gaseous NO of urogenital tract or lumen of intestines, and exhaled air (claimed) for monitoring asthma/other airway inflammation/gastric activity. It also has applications for in-vitro detection of NO in various physiological media resulting from NO-producing living cells, and in-vivo detection of NO in physiological medium and in living cells for measuring metabolic activity/toxicity and for diagnosing hard disease, circulatory shock and cancer as well as in polluted air.

ADVANTAGE - The **semiconductor** device has short response time and its operation is very simple.

DESCRIPTION OF DRAWINGS - The figure shows the molecular controlled **semiconductor** resistor device.

Insulating or semi-insulating layer (1)

Conducting **semiconductor** layer (2)

Conducting pads (3)

Layer of molecules capable of binding nitric oxide (4) **MANUAL CODE:**

CPI: B04-B04H; B04-B04L; B05-A02; B05-A03;

B05-B01B; B05-B01K; B05-B01N; B05-B02B; B05-B02C;
B05-C03; B06-D18; B08-D02; B10-B01A; B11-C08B;
B12-K04A; B12-K04E; D04-A01H; E05-L02A; E05-L02B;
E05-L02C; E05-L03A; E05-L03B; E05-L03D; E05-M;
E05-N; E08-D02; E10-A12A2; E10-B01; E10-B01A4;
E11-Q03; E31-H04; E31-L; J04-B01; L04-D
EPI: S03-E02A; S03-E13B; S03-E14H1; S03-E14H4;
S03-E14H9

TECH

ELECTRONICS - Preferred Structure: The conducting **semiconductor** layer is on the top of (semi)-insulating layers. The two conducting pads are on both sides on top of an upper layer which is conducting **semiconductor** or (semi)-insulating layer. The pads make electrical contact with conducting **semiconductor** layer. The **monolayer** of multi-functional organic molecules capable of binding NO is adsorbed on the **surface** of upper layer, between two conducting pads. The **semiconductor** device comprises:
(1) semi-insulating layer of gallium arsenide (GaAs) sequentially laminated with semi-insulating layer of (aluminum, gallium)arsenide, conducting **semiconductor** layer of doped n-GaAs, and semi-insulating layer of undoped GaAs which is attached to **monolayer** of NO binding molecules;
or
(2) semi-insulating layer of GaAs is sequentially laminated with insulating layer of undoped GaAs, conducting **semiconductor** layer of doped n-(aluminum,gallium)arsenide, semi-insulating undoped (aluminum,gallium)arsenide layer, and upper undoped GaAs semi-insulating layer attached to **monolayer** of NO binding molecules.
The **monolayer** of NO binding molecules further comprise benzoic acid molecules.

INORGANIC CHEMISTRY - Preferred Compounds: The multi-functional organic molecules that binds NO, are chosen from vicinal diamines, metallo porphyrin, metallocphthalocyanine and iron-dithiocarbamate complex that contain functional group(s) (F1) chosen from carboxyl, thiol, acyclic sulfide, cyclic sulfide, hydroxamic acid, trichlorosilane or phosphate. The vicinal diamine is 2,3-diaminonaphthalene, 1,2-diaminobenzene, 1,2-diaminoanthraquinone or aminotroponeiminate having amino group(s) substituted with F1 which is linked to amino group through aliphatic, aromatic or aliphatic spacer. The metalloporphyrin or metallocphthalocyanine, contains metal chosen from Fe, Co, Ni, Zn, Mn, Cu, Ru, V, Pb or Cr as the central atom.

Preferred Composition: The semiconducting layer is semiconductor chosen from group III-IV/II-VI material such as Ga, In, As, Cd, Zn, S, Se and Te, preferably doped n-GaAs or doped n-(Al, Ga) arsenide. The (semi)-insulating layer may serve as the base for device, and consists of dielectric material chosen from silicon oxide, silicon nitride and undoped semiconductor chosen from group III-V/II-VI material such as Ga, As, P, Cd, Zn, S, Se and Te, preferably undoped GaAs or undoped (aluminum,gallium)arsenide.

ABEX SPECIFIC COMPOUNDS - 2,3-diaminonaphthalene, 1,2-diamino benzene, iron-dithiocarbamate complex, hematoporphyrin IX, hematin (ferriprotoporphyrin basic), heme (ferroprotoporphyrin), hemin (ferriprotoporphyrin chloride) and cobaltic protoporphyrin IX chloride, have been claimed for multi-functional organic compound that binds NO.

EXAMPLE - Gallium arsenide (GaAs) was cleaned by boiling in trichloroethylene, acetone and absolute ethanol for 15 minutes. Subsequently GaAs was etched for 10 seconds in a 1:9 NH₃/H₂O (v/v) solution, washed with de-ionized water and dried under nitrogen stream. The molecular controlled semiconductor resistor (MOCSER) was then immersed in dimethyl furan or methylcyanide solutions containing cobaltic protoporphyrin IX (maximum concentration of 15 mM). The devices were rinsed with 5% chloroform/hexane and blown dry under a stream of nitrogen gas. Gas mixture of NO in nitrogen gas or dry air containing 79% of nitrogen, 21% of oxygen, 530 ppm of carbon dioxide, 5 ppm of carbon monoxide and 6 ppm of water, was prepared. Gas mixture was brought in contact with MOCSER at a constant flow, temperature and controlled condition. A constant voltage of 100 mV was applied to MOCSER, and current flowing through MOCSER was monitored using a source measuring unit. The sensor was calibrated using parameter such as saturation value of current range and rate of current change that correlate NO concentration. The MOCSER was found to have excellent reproducibility for constant NO concentration. The sensor was found to have favorable sensitivity towards nitrogen, and the sensor sensitivity was found to be free from the influence of oxygen, carbon dioxide and carbon monoxide.

L113 ANSWER 62 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2002-691455 [74] WPIX
 DOC. NO. CPI: C2002-195322 [74]
 DOC. NO. NON-CPI: N2002-545558 [74]
 TITLE: Preparation of zeolite-substrate composite, used for separating membrane for gas or liquid, comprises combining linking compound onto substrate surface, modifying linking compound, and selectively forming zeolite layer
 DERWENT CLASS: A97; L02; P73
 INVENTOR: CHUN Y; CHUN Y S; HA G; HA K; HAH G; JEON Y S; JUN Y S; LEE G; LEE G S; LEE Y; LEE Y J; PARK Y; PARK Y S; YOON G B; YOON K; YOON K B

10/0400059

PATENT ASSIGNEE: (CHUN-I) CHUN Y; (HAKK-I) HA K; (LEEG-I) LEE G;
 (LEEY-I) LEE Y; (PARK-I) PARK Y; (UYSO-N) UNIV
 SOGANG; (UYSO-N) UNIV SOGANG CORP; (YOON-I) YOON
 K
 COUNTRY COUNT: 24

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|--------|------------|
| WO 2002036340 | A1 | 20020510 | (200274)* | EN | 40[16] | B32B018-00 |
| KR 2002034340 | A | 20020509 | (200274) | KO | | |
| US 20030017936 | A1 | 20030123 | (200310) | EN | | B01J029-04 |
| EP 1337397 | A1 | 20030827 | (200357) | EN | | B32B018-00 |
| KR 395902 | B | 20030825 | (200412) | KO | | |
| US 6693055 | B2 | 20040217 | (200413) | EN | | B01J035-00 |
| JP 2004513051 | W | 20040430 | (200430) | JA | 59 | C01B039-38 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-------------------|------|----------------|----------|
| WO 2002036340 A1 | | WO 2001-KR1854 | 20011101 |
| KR 2002034340 A | | KR 2000-64534 | 20001101 |
| KR 395902 B | | KR 2000-64534 | 20001101 |
| EP 1337397 A1 | | EP 2001-983838 | 20011101 |
| US 20030017936 A1 | | WO 2001-KR1854 | 20011101 |
| EP 1337397 A1 | | WO 2001-KR1854 | 20011101 |
| US 6693055 B2 | | WO 2001-KR1854 | 20011101 |
| JP 2004513051 W | | WO 2001-KR1854 | 20011101 |
| JP 2004513051 W | | JP 2002-539130 | 20011101 |
| US 20030017936 A1 | | US 2002-169187 | 20020628 |
| US 6693055 B2 | | US 2002-169187 | 20020628 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|-----------------|---------------|-----------------|
| KR 395902 B | Previous Publ | KR 2002034340 A |
| EP 1337397 A1 | Based on | WO 2002036340 A |
| US 6693055 B2 | Based on | WO 2002036340 A |
| JP 2004513051 W | Based on | WO 2002036340 A |

PRIORITY APPLN. INFO: KR 2000-64534 20001101

INT. PATENT CLASSIF.:

MAIN: B01J029-04; B01J035-00; B32B018-00; C01B039-38
 SECONDARY: B01J020-18; B01J029-06

BASIC ABSTRACT:

WO 2002036340 A1 UPAB: 20060120

NOVELTY - Preparation of zeolite-**substrate** composite comprising a patterned zeolite mono- or multi- layer, comprises combining a linking compound onto the **substrate surface**, modifying the linking compound or its functional group by irradiating ultraviolet (UV) ray through a photomask having a pattern, and selectively forming a zeolite layer on the area to which UV ray is or is not irradiated.

DETAILED DESCRIPTION - Preparation of zeolite- **substrate** composite comprising a patterned zeolite mono- or multi- layer, comprises combining a linking compound onto the **substrate surface**, modifying the linking compound combined to the **substrate** or its functional group by irradiating ultraviolet (UV) ray through a photomask having a pattern, selectively forming a zeolite layer on the area to which UV ray is or is not irradiated, and optionally performing calcination.

USE - The method is used for preparing a composite of zeolite-**substrate** comprising a patterned layer of zeolite (claimed). The composite having a patterned monolayer or multilayer of molecular sieve can be employed for a separating membrane for gas or liquid, a linear or nonlinear optical device, optoelectronics, a membrane, a membrane catalyst, a sensor carrier, a photocell, or in the field of film formation using the second growth of zeolite.

ADVANTAGE - The composite having a patterned zeolite monolayer or multilayer

via a chemical bond can be prepared. The terminal functional group of the linking compound can be diversely modified, and thus the bonding methods can be diversely modified. Since it is possible to control and modify the type and kind of zeolite and the pattern style of each layer in a multiple layer, the method is practical to use. MANUAL CODE: W11A; L02-G01; L02-J01; L02-J02B

CPI: A12-

TECH

CERAMICS AND GLASS - Preferred Method: The zeolite layer is formed after removing the portion to which UV ray is irradiated or the portion to which UV ray is not irradiated. The linking compound having functional group at both terminals or a blocking compound, which does not have any functional group at one terminal such as octadecyltrichlorosilane was applied and bonded on a part of the **substrate surface** by the stamp method. The patterned or non-patterned layer of zeolite was previously formed on all or part of the **substrate surface**. The zeolite layer is formed or originated from zeolite (or analogous molecular sieve), zeolite (or analogous molecular sieve)-linking compound or crystal grown zeolite. On a patterned zeolite layer, an upper layer consisting of the same or different kind of zeolite is formed to have a pattern. The upper layer is formed to have a pattern the same or different from that of the lower layer.

POLYMERS - Preferred Components: The **substrate** consists of (i) all substances containing **hydroxyl** groups on the **surface**; (ii) metals capable of reacting with a thiol or amino group, (iii) polymers having various functional groups on their **surfaces**; (iv) **semiconductive** materials; or (v) natural or synthetic zeolite or molecular sieve analogs. The linking compound can be intermediated by at least a compound consisting of fullerene (60C, 70C), carbon nanotubes, alpha,omega-dialdehyde, dicarboxylic acid, dicarboxyl acid anhydride, amine-dendrimer, polyethylene imine, alpha, omega-diamine, a complex of (M(salan)) (where M is cobalt, nickel, chromium, manganese, or iron, and salan is N,N-bis(salicylidene)ethylenediamine), and metal **porphyrin** derivatives.

ORGANIC CHEMISTRY - Preferred Compounds: The linking compounds which form the **substrate-linking** compound and the zeolite (or its analog)-linking compound are identical or different from each other and consist of

- (1) R₃Si-L-X,
- (2) MR'4,
- (3) Y-L-Y,
- (4) R₃Si-L-Y,
- (5) HS-L-X,
- (6) HS-L-SiR₃, or
- (7) HS-L-Y.

R = halogen, 1-4C alkoxy or alkyl;

L = hydrocarbon residue, e.g. optionally substituted 1-17C alkyl, aralkyl or aryl, which may have at least one heteroatom such as O, N and S;

X = leaving group such as halogen;

R' = R and two of four R's in MR'4 denote a halogen or alkoxy group;

M = Si or a transition metal such as Ti or Zr;

Y = ligand having a functional group consisting of **hydroxyl**, thiol, amine, ammonium, sulfone and its salt, carboxyl acid and its salt, acid anhydride, epoxy, aldehyde, ester, acrylate, isocyanate (-NCO), sugar residue, double bond, triple bond, diene, diyne, alkylphosphine, alkylamine and a reactive functional group of various coordination compounds capable of exchanging their ligands

At least one of the three Rs in a SiR₃ group denote a halogen or alkoxy group. The functional group can exist in the middle or at the terminal ends of the ligands.

INORGANIC CHEMISTRY - Preferred Components: The zeolite is (1) natural and synthetic zeolite, (2) modified molecular sieve where all or part of the silicon atoms in the zeolite skeleton

are replaced with other atoms such as phosphorus (P) (e.g. AlPO₄ (aluminum phosphate), SAPO (silico alumino phosphate), MeAPO (methyl alumino phosphate), MeAPSO type molecular sieve), (3) modified molecular sieve in which all or part of the aluminum atoms in the zeolite skeleton are replaced with other atoms such as boron (B), gallium (Ga), or titanium (Ti), (4) molecular sieves by the combination of the above modifications of items 2 and 3, (5) porous metals or silicon oxides (e.g. silicalite, MCM type porous silica, porous titanium dioxide, niobium dioxide) or mixed oxide, or (6) porous molecular sieves prepared with any other elements alone or in mixture.

L113 ANSWER 63 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2003-089028 [08] WPIX
 DOC. NO. CPI: C2003-022554 [08]
 DOC. NO. NON-CPI: N2003-070091 [08]
 TITLE: Organic thin film transistor for forming integrated circuit, comprises **self-assembled monolayer** which is a reaction product of gate dielectric and precursor of SAM, placed between gate dielectric and **semiconductor** layer
 DERWENT CLASS: A85; E19; L03; T04; U11; U12; U14
 INVENTOR: BOARDMAN L D; DUNBAR T D; KELLEY T W; MUYRES D V; PELLERITE M J; SMITH T P
 PATENT ASSIGNEE: (MINN-C) 3M INNOVATIVE PROPERTIES CO
 COUNTRY COUNT: 101

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|-------|-------------|
| US 6433359 | B1 | 20020813 | (200308)* | EN | 11[3] | H01L035-24 |
| WO 2003023877 | A2 | 20030320 | (200330) | EN | | H01L051-20 |
| EP 1425806 | A2 | 20040609 | (200438) | EN | | H01L051-20 |
| KR 2004029143 | A | 20040403 | (200451) | KO | | H01L029-786 |
| AU 2002331736 | A1 | 20030324 | (200460) | EN | | H01L051-20 |
| JP 2005503026 | W | 20050127 | (200510) | JA | 46 | H01L029-786 |
| CN 1554126 | A | 20041208 | (200517) | ZH | | H01L051-20 |
| TW 225708 | B1 | 20041221 | (200540) | ZH | | H01L027-13 |
| AU 2002331736 | A8 | 20051020 | (200615) | EN | | H01L051-20 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|------------------|------|-----------------|----------|
| US 6433359 B1 | | US 2001-947845 | 20010906 |
| AU 2002331736 A1 | | AU 2002-331736 | 20020826 |
| CN 1554126 A | | CN 2002-817538 | 20020826 |
| EP 1425806 A2 | | EP 2002-768718 | 20020826 |
| WO 2003023877 A2 | | WO 2002-US27172 | 20020826 |
| EP 1425806 A2 | | WO 2002-US27172 | 20020826 |
| JP 2005503026 W | | WO 2002-US27172 | 20020826 |
| TW 225708 B1 | | TW 2002-120296 | 20020905 |
| JP 2005503026 W | | JP 2003-527816 | 20020826 |
| KR 2004029143 A | | KR 2004-703160 | 20040303 |
| AU 2002331736 A8 | | AU 2002-331736 | 20020826 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|------------------|----------|-----------------|
| EP 1425806 A2 | Based on | WO 2003023877 A |
| AU 2002331736 A1 | Based on | WO 2003023877 A |
| JP 2005503026 W | Based on | WO 2003023877 A |
| AU 2002331736 A8 | Based on | WO 2003023877 A |

PRIORITY APPLN. INFO: US 2001-947845 20010906

INT. PATENT CLASSIF.:

MAIN: H01L027-13; H01L029-786; H01L035-24; H01L051-20

SECONDARY: H01L021-3205; H01L051-00; H01L051-40

BASIC ABSTRACT:

US 6433359 B1 UPAB: 20060118

NOVELTY - Providing thin film transistors with improvements in properties such as on/off ratio, threshold voltage, sub-threshold slope and charge-carrier mobility, thus enabling the production of more complicated circuits having faster switching speeds and simpler processing conditions.

DETAILED DESCRIPTION - An organic thin film transistor (OTFT) comprises SAM (16) interposed between a gate dielectric (14) and an organic **semiconductor** layer(18). The **monolayer** is a product of reaction between gate dielectric and a precursor of SAM. The precursor is represented by formula X-Y-Zn.

X = H or CH₃;

Y = 5-50C (cyclic) aliphatic, 8-50C aromatic group or 3-44C (cyclic) aliphatic group;

Z = -PO₃H₂, -OPO₃H₂, benzotriazolyl, carbonyloxybenzotriazole, oxybenzotriazole, aminobenzotriazole, -CONHOH, -COOH, -OH, -SH, -COSH, -COSeH, -C5H₄N, -SeH, -SO₃H, -NC, -SiCl(CH₃)₂, -SiCl₂CH₃, amino or phosphinyl; andn = 1-3, when Z = -SiCl(CH₃)₂ or -SiCl₂CH₃, n = 1.

INDEPENDENT CLAIMS are included for:

(1) making organic thin film transistor (OTFT) by providing a gate electrode (12) and a gate dielectric on a **substrate** (26) and forming a **self- assembled monolayer** and an organic **semiconductor** layer adjacent to the gate dielectric; providing a source electrode (22) and a drain electrode (24) contiguous to the organic **semiconductor** layer;

(2) an integrated circuit which comprises several thin film transistors; and
 (3) a composition comprising 1-phosphono-3,7,11,15- tetramethyl hexadecane.

USE - For forming integrated circuit (claimed) used for radio-frequency identification tags, backplanes for active matrix displays, smart cards and memory devices.

ADVANTAGE - The organic thin film transistor has improved threshold voltage, sub-threshold slope, on/off ratio and charge-carrier mobility. The production of more complicated circuits having faster switching speeds and simpler processing conditions, is enabled. The manufacturing costs of devices with large feature sizes is minimized.

DESCRIPTION OF DRAWINGS - The figure shows schematic cross-sectional view of organic thin film transistor.

Gate electrode (12)

Gate dielectric (14)

Self-assembled monolayer (16)Organic **semiconductor** layer (18)

Source electrode (22)

Drain electrode (24)

Substrate (26)

MANUAL CODE: CPI: A12-E07C; E05-E01; E05-E02; E05-G; E05-G01;
 E05-G02; E05-G03; E05-G08; E05-G09; E05-K;
 E06-D08; E07-D04C; E10-A09B; E10-A15; E10-A18B;
 E10-B01; E10-B04; E10-C01; E10-C02; E10-C04;
 E10-E01; E10-E02D; E10-E02U; E10-E03; E10-E04H;
 E10-E04L; E10-E04M; L04-C12; L04-E01E
 EPI: T04-H03B; T04-K01; T04-L01; U11-C18A1;
 U12-B03A; U12-B03C; U14-K01A2B

TECH

ELECTRONICS - Preferred Properties: The thin film transistor has a threshold voltage of -25 volts to 25 volts, a sub-threshold slope below 10 volts per decade, an on/off ratio of at least 10⁴ and charge-carrier mobility of at least 25%, preferably 100 % better than a comparison OTFT that lacks SAM. SAM is provided by coating process selected from spray, spin, dip, gravure, microcontact printing, ink jet printing, stamping, transfer printing and vapor deposition. The manufacture of OTFT is carried below a peak **substrate** temperature of 250 degrees C, preferably below 70degreesC.

INORGANIC CHEMISTRY - Preferred Materials: The gate dielectric comprises an inorganic electrically insulating material selected from strontiates, tantalates, titanates, zirconates, aluminum

oxides, silicon oxides, tantalum oxides, titanium oxides, silicon nitrides, barium titanate, barium strontium titanate, barium zirconium titanate, zinc selenide, zinc sulfide and/or their alloys.

The thin film transistor further comprises a flexible non-participating **substrate** selected from inorganic glasses, ceramic foils, polymeric materials, filled polymeric materials, coated metallic foils, acrylics, epoxies, polyamides, polycarbonates, polyimides, polyketones, poly(ether ether ketone), polynorbornenes, polyphenylene oxides, poly(ethylene naphthalene dicarboxylate), poly(ethylene terephthalate), poly(phenylene sulfide) and fiber-reinforced plastics.

The gate electrode comprises aluminum, chromium, gold, silver, nickel, palladium, platinum, tantalum, titanium, polyaniline, poly(3,4-oxyethylene oxythiophene)/poly(styrene sulfonate) and/or their alloys.

The source and/or drain electrode(s) contains aluminum, barium, calcium, chromium, gold, silver, nickel, palladium, platinum, titanium, polyaniline, poly(3,4-ethylene dioxythiophene)/poly(styrene sulfonate) and/or their alloys.

The organic **semiconductor** layer comprises acenes, perylenes, fullerenes, **phthalocyanines** or oligothiophenes, preferably pentacene.

ABEX SPECIFIC COMPOUNDS - The precursor is 1-phosphonohexane, 1-phosphonoctane, 1-phosphonohexadecane or 1-phosphono-3,7,11,15-tetramethyl hexadecane.

EXAMPLE - A silicon wafer substrate
was quartered and cleaned using a 5-minute exposure in a ultraviolet/ozone chamber. 1-phosphonohexadecane was applied to the alumina **surface** of the **substrate** by spin coating 0.1 weight% of solution of precursor in absolute ethanol at 300 rpm for 5 seconds, followed by 2000 rpm for 15 seconds. The coated **substrate** was heated at 150 degrees C for 3 minutes on a vacuum hot **plate**, then rinsed in fresh ethanol and dried under a nitrogen stream, to obtain a **self-assembled monolayer** (SAM) on the alumina layer of the **substrate**. The wet contact angles (WCA) and coating thickness of SAM were determined. SAM had thickness of 19 Angstrom, static WCA of 109, advancing WCA of 116 and receding WCA of 103. Pentacene was purified in a 3-ozone furnace at reduced pressure under constant flow of nitrogen gas. The purified pentacene was deposited by sublimation under vacuum onto SAM **surface** at a rate of 0.5 Angstrom/second to reach thickness of 500 Angstrom as measured by quartz crystal microbalance. Palladium or gold source and drain electrodes were than shadow masked onto the pentacene layer, to obtain an organic thin film transistor (OTFT). OTFT had mobility of 2.056 cm²/Vs, threshold voltage of -4.86 V, sub-threshold slope of 5.24 V/decade and on/off ratio of 2.38 x 106.

L113 ANSWER 64 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2002-114492 [15] WPIX
 DOC. NO. CPI: C2002-035224 [15]
 DOC. NO. NON-CPI: N2002-085321 [15]
 TITLE: Zeolite-**substrate** composite comprising zeolite **monolayer** or multilayer bound on **substrate** **surface** for, e.g. separation of gas or liquid, comprises **substrate**, molecular sieve particles, and linker
 DERWENT CLASS: E19; H04; J01; J04; P73
 INVENTOR: CHOI S; CHOI S Y; CHUN Y; HA G; HA K; HAH G; JEON Y S; JUN Y S; LEE G; LEE G S; LEE Y; LEE Y J; OH G S; OH K; PARK Y; PARK Y S; YOON G B; YOON K B
 PATENT ASSIGNEE: (UYSE-N) UNIV SEOGANG; (UYSO-N) UNIV SOGANG;
 (YOON-I) YOON K B
 COUNTRY COUNT: 22

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|--------|------------|
| WO 2001096106 | A1 | 20011220 | (200215)* | EN | 69[28] | B32B027-00 |
| KR 2001096777 | A | 20011108 | (200226) | KO | | B32B018-00 |
| KR 335966 | B | 20020510 | (200272) | KO | | B32B018-00 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|------------------|------|----------------|----------|
| WO 2001096106 A1 | | WO 2000-KR1002 | 20000902 |
| KR 2001096777 A | | KR 2000-19667 | 20000414 |
| KR 335966 B | | KR 2000-19667 | 20000414 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|-------------|---------------|-----------------|
| KR 335966 B | Previous Publ | KR 2001096777 A |

PRIORITY APPLN. INFO: KR 2000-19667 20000414

INT. PATENT CLASSIF.:

MAIN: B32B018-00; B32B027-00

BASIC ABSTRACT:

WO 2001096106 A1 UPAB: 20060118

NOVELTY - A zeolite-**substrate** composite comprising a zeolite **monolayer** or multilayer bound on the surface of **substrate** comprises:

(i) **substrate** having hydroxyl groups, metal **substrate**, or polymeric **substrate**;

(ii) molecular sieve particles; and

(iii) linker.

The chemical bonding of the linker to the **substrate** and to the zeolite or its analog is by covalent-, ionic-, and coordination bonds.

DETAILED DESCRIPTION - A zeolite-**substrate** composite comprising zeolite **monolayer** or multilayer which is bound on the surface of **substrate** comprises:

(i) **substrate** consisting of **substrate** having hydroxyl groups, metal **substrate** capable of being reacted with thiol groups, or polymeric **substrate** having reactive functional groups in the main chain or side chains;

(ii) molecular sieve particles consisting of porous oxides, or sulfides having surface hydroxyl groups; and

(iii) linker derived from a linking compound having at least two functional groups at both terminal ends, one terminal end being chemically bonded to the **substrate** and the other being chemically bonded to the zeolite.

The chemical bonding of the linker to the **substrate** and to the zeolite of its analog is attained by covalent-, ionic-, and coordination bonds. The linker is a linking chain or a combination of linking chains derived from organic linking compound(s) consisting of Z-L-X, MR'4, R3Si-L-Y, HS-L-X, HS-L-SiR3, or HS-L-Y.

Z = -SiR3, or isocyanate;

R = halo, 1-4C alkoxy or alkyl, at least one of three R substituents being halo or alkoxy;

L = organic linking chain or linker from divalent hydrocarbon residues, optionally substituted 1-17C alkyl, aralkyl, or aryl, which may have at least one heteroatom as O, N, or S;

X = reactive functional group as halo, isocyanate, tosyl, or azide;

R' = R, at least two of the four R' substituents being halo or alkoxy;

M = Si or a transitional metal as Ti or Zr;

Y = ligand having functional group consisting of hydroxyl, thiol, amine, ammonium, sulfone and its salt, carboxylic acid and its salt, acid anhydride, epoxy, aldehyde, ester, acrylate, isocyanate, sugar residues, double bond, triple bond, diene, diyne, alkyl phosphine, or alkyl amine and the functional group can exist in the middle or at the terminal ends of the ligands.

An INDEPENDENT CLAIM is also included for a method for the preparation of a zeolite-**substrate** composite having a zeolite **monolayer** or multilayer bound on the surface of the **substrate** comprising:

(a) chemically combining a **substrate** (S) or zeolite or its analog (Z) with a linking compound (L-A) having at least two terminal functional groups to prepare a **substrate-linker** (S-L-A) intermediate composite or a linker-zeolite (L-B-Z) intermediate composite;

(b) chemically combining the intermediate composites with zeolite or its analog or a **substrate** to prepare a **substrate-linker-zeolite** (S-L-Z) composite, and

(c) optionally calcining the resulting composite.

USE - The zeolite **monolayer** and multilayer can be used in fields related to separation of gas or liquid, linear or nonlinear optical device, opto-electronics, membrane, membrane catalyst, sensor carrier, photocell, or film formation using a second growth of zeolite.

ADVANTAGE - The zeolite **monolayer** or multilayer can be formed on the **surface** of various **substrates** via chemical bond. The zeolite- **substrate** composite is durable and the attached zeolite particles have a lightly oriented arrangement. The thickness of zeolite layer and the repeating number of zeolite layers can be conveniently controlled.

MANUAL CODE: CPI: E05-E; E05-L01; E05-M; E31-P02B; E31-P06B; E35-K03; E35-L; H04-E; H04-F02E; J01-D06; J01-E02D; J01-E03F; J04-E04

TECH

INORGANIC CHEMISTRY - Preferred **Substrate**: The

substrate consists of :

(i) oxides or mixed oxides of metals and non-metals having **surface hydroxyl** groups, such as **silicon**, aluminum, titanium, tin or indium, from groups consisting of quartz, mica, glass, ITO glass (glass deposited with indium oxide of tin), various conductible glass such as tin oxide (SnO_2), (porous) silica, (porous) alumina, (porous) titanium dioxide or **silicon wafer**;

(ii) metals capable of reacting with a thiol group, such as gold, silver, copper, or platinum;

(iii) polymers having various functional groups on their **surface**, such as polyvinyl chloride (PVC), or a Merrifield peptide resin;

(iv) **semiconductive** materials such as selenium-zinc (ZnSe), gallium-arsenic (GaAs), and indium-phosphor (InP);

(v) synthetic or natural zeolite or its analogs, or

(vi) natural materials of high molecular weight, which carry **hydroxyl** groups on their **surfaces**, such as cellulose, starch (amylose and amylopectin) or lignin.

Preferred Materials: The zeolite or its analog is:

(a) natural or synthetic zeolite;

(b) modified molecular sieves in which all or part of the **silicon** atoms in the zeolite skeleton are replaced with other atoms and consisting of AlPO₄ type, SAPO type, MeAPO type or MeAPSO type molecular sieve or its analogs;

(c) modified molecular sieve in which all or part of the aluminum atoms in the zeolite skeleton are replaced with other atoms consisting of boron, gallium, or titanium;

(d) molecular sieves combining the above modifications (b) and (c);

(e) porous metals or **silicon** oxides or their mixed oxides consisting of silicalite, MCM type porous silica, porous titanium dioxide or niobium dioxide, or

(f) porous molecular sieves prepared by using any other elements alone or in a mixture.

ORGANIC CHEMISTRY - Preferred Linker: The linker comprises in its chain a space linker derived from a space linking compound consisting of fullerene (60C, 70C), carbon nanotubes, alpha, omega-dialdehyde, dicarboxylic acid, dicarboxylic acid anhydride, amine-dendrimer, polyethyleneimine, alpha, omega-diamine, complex of (M(salen)) where M is metal element such as cobalt, nickel, chromium, manganese, or iron and salen is N,N'-bis(salicylidene)ethylenediamine), metal **porphyrine** derivatives, and any other coordination compounds.

ABEX EXAMPLE - Glass plates were dipped to a reaction vessel containing 30 ml toluene. 0.5 ml (3-chloropropyl)trimethoxysilane was added. After heating for 3 hours, the glass plates

were washed with toluene. Zeolite particles (0.02 g) were thoroughly dispersed in 30 ml toluene to give a zeolite suspension, in which the glass plates having surface 3-chloropropyl groups previously obtained were dipped and subjected to ultrasonic vibration for more than 30 seconds. After heating for 3 hours and cooling at room temperature, the glass plate coated with a zeolite monolayer was taken from the suspension, dipped in toluene, and subjected to ultrasonic vibration for 1 minute or more to remove any unreacted zeolite particles which were loosely attached on the zeolite monolayer.

L113 ANSWER 65 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2001-425043 [45] WPIX
 DOC. NO. CPI: C2001-128534 [45]
 DOC. NO. NON-CPI: N2001-315356 [45]
 TITLE: Preparing patterned layer of aligned carbon nanotubes on substrate for semiconductors, includes applying polymeric material pattern on substrate using soft lithographic technique, carbonizing or synthesizing aligned carbon nanotubes layer
 DERWENT CLASS: A35; A89; E12; E36; L03; Q68; U11; U12
 INVENTOR: DAI L; DAI L M; HUANG S; MAU A
 PATENT ASSIGNEE: (CSIR-C) COMMONWEALTH SCI & IND RES ORG
 COUNTRY COUNT: 93

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|-------|------------|
| WO 2001021863 | A1 | 20010329 | (200145)* | EN | 26[6] | |
| AU 2000076340 | A | 20010424 | (200145) | EN | | |
| EP 1230448 | A1 | 20020814 | (200261) | EN | | |
| JP 2003510236 | W | 20030318 | (200321) | JA | 29 | C01B031-02 |
| AU 776402 | B2 | 20040909 | (200479) | EN | | |
| US 6866801 | B1 | 20050315 | (200520) | EN | | |
| EP 1230448 | B1 | 20060802 | (200651) | EN | | |
| DE 60029816 | E | 20060914 | (200661) | DE | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|---------------|------|----------------|----------|
| WO 2001021863 | A1 | WO 2000-AU1180 | 20000922 |
| AU 2000076340 | A | AU 2000-76340 | 20000922 |
| AU 776402 | B2 | AU 2000-76340 | 20000922 |
| EP 1230448 | A1 | EP 2000-965658 | 20000922 |
| EP 1230448 | B1 | EP 2000-965658 | 20000922 |
| EP 1230448 | A1 | WO 2000-AU1180 | 20000922 |
| JP 2003510236 | W | WO 2000-AU1180 | 20000922 |
| US 6866801 | B1 | WO 2000-AU1180 | 20000922 |
| EP 1230448 | B1 | WO 2000-AU1180 | 20000922 |
| JP 2003510236 | W | JP 2001-525017 | 20000922 |
| US 6866801 | B1 | US 2002-88737 | 20020619 |
| DE 60029816 | E | DE 2000-629816 | 20000922 |
| DE 60029816 | E | EP 2000-965658 | 20000922 |
| DE 60029816 | E | WO 2000-AU1180 | 20000922 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|---------------|------|--------------------|
| AU 776402 | B2 | Previous Publ |
| AU 2000076340 | A | Based on |
| EP 1230448 | A1 | Based on |
| JP 2003510236 | W | Based on |
| | | AU 2000076340 A |
| | | WO 2001021863 A |
| | | WO 2001021863 A |
| | | WO 2001021863 A |

| | | | | |
|-------------|----|----------|---------------|---|
| AU 776402 | B2 | Based on | WO 2001021863 | A |
| US 6866801 | B1 | Based on | WO 2001021863 | A |
| EP 1230448 | B1 | Based on | WO 2001021863 | A |
| DE 60029816 | E | Based on | EP 1230448 | A |
| DE 60029816 | E | Based on | WO 2001021863 | A |

PRIORITY APPLN. INFO: AU 1999-3041 19990923

INT. PATENT CLASSIF.:

| | |
|-----------------|--|
| MAIN: | C01B031-02 |
| IPC ORIGINAL: | C01B0031-00 [I,C]; C01B0031-02 [I,A]; C30B0023-02 [I,C]; C30B0023-04 [I,A]; C30B0029-00 [I,C]; C30B0029-02 [I,A]; C30B0029-66 [I,A]; C01B0031-00 [I,C]; C01B0031-02 [I,A]; C30B0023-02 [I,C]; C30B0023-04 [I,A]; C30B0029-00 [I,C]; C30B0029-02 [I,A]; C30B0029-66 [I,A] |
| IPC RECLASSIF.: | C01B0031-00 [I,C]; C01B0031-02 [I,A]; C30B0023-02 [I,C]; C30B0023-04 [I,A]; C30B0025-00 [I,A]; C30B0025-00 [I,C]; C30B0029-00 [I,C]; C30B0029-02 [I,A]; C30B0029-02 [I,C]; C30B0029-66 [I,A] |

BASIC ABSTRACT:

WO 2001021863 A1 UPAB: 20050901

NOVELTY - Preparing a patterned layer of aligned carbon nanotubes on a **substrates** using a soft lithographic technique.

DETAILED DESCRIPTION - Preparing a patterned layer of aligned carbon nanotubes on a **substrate** including:

- (a) applying a pattern of polymeric material on the **surface** of a **substrate** capable of supporting nanotube capable of supporting nanotube growth using a soft lithographic technique;
- (b) subjecting the polymeric material to carbonization to form a patterned layer of carbonized polymer on the **surface** of the **substrate**; or
- (c) synthesizing a layer of aligned carbon nanotubes on regions of the **substrate** to which carbonized polymer is not attached to provide a patterned layer of aligned carbon nanotubes on the **substrate**.

INDEPENDENT CLAIMS are also included for:

- (1) a patterned carbon nanotube film prepared using the claimed method;
- (2) a device comprising a patterned carbon nanotube film prepared by the claimed method; and
- (3) a photovoltaic cell comprising a patterned carbon nanotube film prepared by the claimed method.

USE - Used for photonic and electronic devices for use as electron field emitters in **panel** displays, single molecular transistors, scanning probe microscope tips, gas electrochemical energy storages, catalyst and proteins/DNA supports, artificial actuators, chemical sensors, molecular filtration membranes, energy absorbing materials, **semiconductors**, molecular transistors and other opto-electronic devices.

ADVANTAGE - Allows resolutions up to a sub-micrometer scale.

DESCRIPTION OF DRAWINGS - Figure 2 is a schematic showing the stages involved in the preparation of a pattern layer of aligned carbon nanotubes.

MANUAL CODE: CPI: A10-E05B; A11-B05; A12-E07C; A12-L02B2; E05-U; E05-U02; L04-C06; N02-A; N02-C01; N04-A; N05-B; N05-C
EPI: U11-C04A7; U12-B03X

TECH

CERAMICS AND GLASS - Preferred **Substrate**: The **substrate** is a glass selected from quartz glass, graphite, mica, mesaporous silica, **silicon wafer**, nanoporous alumina and ceramic plates, preferably quartz glass or **silicon wafer**.

The **substrate** comprises a coating of a material which is capable of supporting carbon nanotube growth under the conditions employed.

Preferred Coating: The coating is selected from metal, metal alloy or compound having conducting or **semiconductor** properties, preferably selected from Au, Pt, Cu, Fe, Co and Pd. The coating is a metal compound or metal alloy selected from an oxide, carbide, nitride, sulfide or boride, preferably selected from indium tin oxide (ITO), Al2O3, TiO2, and MgO.

The coating is a **semiconducting** material selected from gallium arsenide, aluminum arsenide, aluminum sulfide and gallium sulfide.

Preferred Process: The soft lithographic technique is preferably a microcontact printing technique, micromolding technique.

Self-assembling monolayers (SAMS) or a molecular ink is applied to the **surface** of the **substrate** in a region specific manner, followed by adsorption of the polymeric material in the SAM-free regions. The hydrophobicity and hydrophilicity of the **surface** of the **substrate** is altered by the region specific transfer of the **substrate** of a material which alters the hydrophobicity or hydrophilicity of the **surface**, followed by the adsorption of the polymer in the more hydrophobic regions of the **substrate surface**.

The micromolding technique comprises applying a thin layer of a solution of the polymeric material in a solvent to the **substrate surface**, sandwiching the solution between the **substrate surface** and a mold **surface**, the mold having incised areas corresponding to the pattern to be formed on the **substrate** **surface**, allowing the solvent to evaporate and removing the mold to provide a pattern of polymeric material on the **substrate**.

Preferred Molecular Ink: The molecular ink is an alkylsiloxane which is applied using a stamp.

POLYMERS - Preferred Polymer: The polymer is a photoresist or photoresponsive material.

The polymeric material is (DNQ)-modified cresol novolac resin or Ozatek PL 14(TM) (Hoescht) selected from epoxy resins, PEO, polyanilines, polymethyl methacrylates, polystyrenes, polydienes, and plasma polymers derived from (un)saturated alcohols, ketones, aldehydes, amines or amides.

Preferred Mold: The mold is composed of PDMS, fluorocarbon or other solvent resistant elastomers.

Preferred Process: The polymeric material is carbonized by heating to a temperature at or above a temperature at which the polymeric material decomposes.

The aligned carbon nanotubes are synthesized by pyrolysis of a carbon-containing material in the presence of a suitable catalyst for nanotube formation.

The pyrolysis is carried out at 500 - 1100 degreesC.

The process further comprises dissociating the aligned carbon nanotubes from the **substrates** by immersing the sample in an aqueous hydrofluoric acid solution (10-40 %w/w).

The dissociation comprises transferring the patterned carbon nanotube layer to another **substrate** selected from another **substrate** capable of supporting carbon nanotube growth, a metal, metal oxide, **semiconductor** or a polymer selected from adhesive coated polymers preferably cellulose, conjugated (conducting) polymers, temperature/pressure responsive polymers, bioactive polymers and engineering resins.

Preferred Catalyst: The carbon-containing material is selected from alkanes, alkenes, alkynes or aromatic hydrocarbons and their derivatives, preferably from methane, acetylene and benzene, organometallic compounds of transition metals selected from metallocenes and other suitable evaporable metal complexes.

The catalyst is a transition metal selected from Fe, Co, Al, Ni, Mn, Pd, Cr or alloys in any suitable oxidation state.

The catalyst is incorporated in the carbon-containing material.

The catalyst is selected from Fe(II)**phthalocyanine**, Ni(II) **phthalocyanine** and ferrocene.

Preferred Catalyst Preparation: The catalyst preparation further comprises an additional source of catalyst, carbon-containing material.

ABEX EXAMPLE - Quartz glass plates were cleaned by heating in a Piranha solution (a mixture of 98% H₂SO₄ and 30% H₂O₂ at 7:3

v/v) at 70 degreesC for about 30 minutes, followed by thoroughly rinsing with deionized water. PDMS stamp was used for patterning an octadecyltrichlorosiloxane (OST) SAM layer on the cleaned quartz surface. After the contact transfer of the ink (i.e. 0.2% w/w of OST in hexane), the PDMS stamp was left in contact with the substrate for 15-30 seconds, and the patterned substrate was then immersed into a diazonaphthoquinone (DNQ) modified cresol novolak photoresist solution (0.5 -1.0 mg/ml) in ethoxyethyl acetate/acetone (1/10-1/5 v/v) for about 1 second for selective absorption of the polymer into the OST-free region. The polymer pre-patterned quartz plate was heated at high temperature under Ar atmosphere to carbonize the photoresist polymer into a carbon layer. The carbonization was carried out to heat the patterned DNQ-novolak photoresist coating at 150 degreesC, 300, 500, 700 and 900 degreesC for 30 minutes at each temperature. The carbon nanotube patterns were then prepared by selectively growing aligned nanotubes in the photoresist-free regions by pyrolysis of FePc under Ar at 800-1000 degreesC.

L113 ANSWER 66 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2000-411931 [35] WPIX
 DOC. NO. CPI: C2000-124823 [35]
 TITLE: Modified nucleic acid oligomer, useful for sequencing by hybridization, is substituted by redox agent to allow electrical detection of hybridization
 DERWENT CLASS: B04; C07; D16; L02; L03
 INVENTOR: ADAM H; GERHARD H; HARTWICH G; HELLER A
 PATENT ASSIGNEE: (FRIZ-N) FRIZ BIOCHEM GMBH; (HART-I) HARTWICH G
 COUNTRY COUNT: 86

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|---------------|------|----------|-----------|----|-------|------------|
| WO 2000031101 | A1 | 20000602 | (200035)* | DE | 49[5] | C07H021-00 |
| DE 19921940 | A1 | 20000615 | (200035) | DE | | C12Q001-68 |
| AU 2000013836 | A | 20000613 | (200043) | EN | | C07H021-00 |
| DE 19964220 | A1 | 20010419 | (200123) | DE | | C12N011-14 |
| EP 1133514 | A1 | 20010919 | (200155) | DE | | |
| BR 9915526 | A | 20011113 | (200201) | PT | | |
| KR 2001080973 | A | 20010825 | (200215) | KO | | C12Q001-68 |
| CN 1324365 | A | 20011128 | (200219) | ZH | | |
| MX 2001003985 | A1 | 20010601 | (200235) | ES | | |
| AU 751220 | B | 20020808 | (200263) | EN | | |
| JP 2002532386 | W | 20021002 | (200279) | JA | 69 | C07H021-00 |
| DE 19921940 | C2 | 20030206 | (200312) | DE | | C12Q001-68 |
| DE 19964220 | C2 | 20030703 | (200345) | DE | | C12N011-14 |
| ZA 2001003180 | A | 20030625 | (200348) | EN | 64 | C07H000-00 |
| RU 2213095 | C2 | 20030927 | (200371) | RU | | |
| IN 2002000474 | P2 | 20050624 | (200572) | EN | | |
| US 7056664 | B1 | 20060606 | (200637) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-----------------------|------|------------------|----------|
| WO 2000031101 A1 | | WO 1999-EP8888 | 19991119 |
| DE 19921940 A1 | | DE 1999-19921940 | 19990429 |
| DE 19964220 A1 Div Ex | | DE 1999-19921940 | 19990429 |
| DE 19921940 C2 | | DE 1999-19921940 | 19990429 |
| DE 19964220 C2 Div Ex | | DE 1999-19921940 | 19990429 |
| DE 19964220 A1 | | DE 1999-19964220 | 19990429 |
| DE 19964220 C2 | | DE 1999-19964220 | 19990429 |
| BR 9915526 A | | BR 1999-15526 | 19991119 |
| CN 1324365 A | | CN 1999-812448 | 19991119 |

| | |
|------------------|-------------------------|
| EP 1133514 A1 | EP 1999-972637 19991119 |
| EP 1133514 A1 | WO 1999-EP8888 19991119 |
| BR 9915526 A | WO 1999-EP8888 19991119 |
| JP 2002532386 W | WO 1999-EP8888 19991119 |
| RU 2213095 C2 | WO 1999-EP8888 19991119 |
| IN 2002000474 P2 | WO 1999-EP8888 19991119 |
| AU 2000013836 A | AU 2000-13836 19991119 |
| AU 751220 B | AU 2000-13836 19991119 |
| JP 2002532386 W | JP 2000-583928 19991119 |
| RU 2213095 C2 | RU 2001-114192 19991119 |
| ZA 2001003180 A | ZA 2001-3180 20010419 |
| MX 2001003985 A1 | MX 2001-3985 20010420 |
| KR 2001080973 A | KR 2001-705877 20010510 |
| IN 2002000474 P2 | IN 2002-KN474 20010427 |
| US 7056664 B1 | WO 1999-EP8888 19991119 |
| US 7056664 B1 | US 2001-856543 20011213 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|---------------|------|---------------|
| AU 751220 | B | Previous Publ |
| DE 19964220 | A1 | Div ex |
| DE 19964220 | C2 | Div ex |
| DE 19921940 | C2 | Div in |
| AU 2000013836 | A | Based on |
| EP 1133514 | A1 | Based on |
| BR 9915526 | A | Based on |
| AU 751220 | B | Based on |
| JP 2002532386 | W | Based on |
| RU 2213095 | C2 | Based on |
| US 7056664 | B1 | Based on |

PRIORITY APPLN. INFO: DE 1999-19921940 19990429
DE 1998-19853957 19981123

INT. PATENT CLASSIF.:

MAIN: C07H021-00; C12N011-14; C12Q001-68; C07H
 SECONDARY: C07H021-02; C07H021-04; C12N015-09; C23C022-28;
 G01N027-12; G01N027-26; G01N027-30; G01N027-416;
 G01N027-48; G01N033-483; G01N033-50; G01N033-566;
 C12Q

IPC ORIGINAL: C07H0021-00 [I,A]; C12Q0001-68 [I,A]

BASIC ABSTRACT:

WO 2000031101 A1 UPAB: 20060116

NOVELTY - Nucleic acid oligomer (I) modified by a redox-active substance (II) that is oxidizable and reducible selectively at a potential (ϕ) of 2 to -2 V, relative to the standard hydrogen electrode, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (a) a method for producing (I);
- (b) a modified conductive surface that has one or more types of (I) bound to it;
- (c) a method for producing surfaces of (b); and
- (d) a method for electrochemical detection of nucleic acid oligomer hybridization events, using the surface of (b).

USE - (I) is useful for DNA or RNA sequencing, e.g. in clinical diagnosis, toxicological testing, for research and development in genetics, agriculture and pharmaceuticals.

ADVANTAGE - (I) permits electrical detection of a hybridization signal (eliminating the need for fluorophores, radioisotopes etc.), resulting in a simple and inexpensive method for sequence determination. It also opens up the possibility of developing a battery-operated sequencer for use in the field. MANUAL CODE: CPI: B04-B03C; B04-E01; B11-C08; B12-K04A;

B12-K04E; B12-K04F; C04-B03C; C04-E01; C11-C08;
 C12-K04A; C12-K04E; C12-K04F; D05-H09; D05-H12;
 D05-H18A; L02-H02B3; L02-H04; L03-A01

Member(0001)
 ABEQ DE 19921940 A1 UPAB 20060116

NOVELTY - Nucleic acid oligomer (I) modified by a redox-active substance (II) that is oxidizable and reducible selectively at a potential (phi) of 2 to -2 V, relative to the standard hydrogen electrode, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (a) a method for producing (I);
- (b) a modified conductive **surface** that has one or more types of (I) bound to it;
- (c) a method for producing **surfaces** of (b); and
- (d) a method for electrochemical detection of nucleic acid oligomer hybridization events, using the **surface** of (b).

USE - (I) is useful for DNA or RNA sequencing, e.g. in clinical diagnosis, toxicological testing, for research and development in genetics, agriculture and pharmaceuticals.

ADVANTAGE - (I) permits electrical detection of a hybridization signal (eliminating the need for fluorophores, radioisotopes etc.), resulting in a simple and inexpensive method for sequence determination. It also opens up the possibility of developing a battery-operated sequencer for use in the field.

Member(0004)

ABEQ DE 19964220 A1 UPAB 20060116

NOVELTY - Nucleic acid oligomer (I) modified by a redox-active substance (II) that is oxidizable and reducible selectively at a potential (phi) of 2 to -2 V, relative to the standard hydrogen electrode, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (a) a method for producing (I);
- (b) a modified conductive **surface** that has one or more types of (I) bound to it;
- (c) a method for producing **surfaces** of (b); and
- (d) a method for electrochemical detection of nucleic acid oligomer hybridization events, using the **surface** of (b).

USE - (I) is useful for DNA or RNA sequencing, e.g. in clinical diagnosis, toxicological testing, for research and development in genetics, agriculture and pharmaceuticals.

ADVANTAGE - (I) permits electrical detection of a hybridization signal (eliminating the need for fluorophores, radioisotopes etc.), resulting in a simple and inexpensive method for sequence determination. It also opens up the possibility of developing a battery-operated sequencer for use in the field.

TECH

ORGANIC CHEMISTRY - Preferred Redox Agents: (II) is a dye, particularly a flavin, **porphyrin** or (bacterio)chlorophyll derivative or a quinone, particularly a pyrrolo-quinoline quinone, 1,4-benzoquinone; 1,2- or 1,4-naphthoquinone or a 9,10-anthraquinone. Phi is preferably 0.9 to -0.7 V. (II) is covalently linked to any suitable position in (I), optionally via a spacer, particularly to a terminal unit of (I).

Preparation: (II) is bound to a phosphoric acid or carboxylic acid group in (I) by amide or (thio)ester bond formation, through an amino, **hydroxy** or mercapto group in (II) or by condensation reaction between an amino group in (I) and an aldehyde group in (II).

INSTRUMENTATION AND TESTING - Preferred **Surface**: The conductive **surface** is a metal or alloy, e.g. platinum, gold, cadmium etc., a **semiconductor**, preferably carbon, **silicon**, germanium or alpha-tin, a binary compound between elements of groups 14+16, 13+15, 15+16 or 11+17, particularly copper (I) or silver (I) halides, or ternary compounds between elements of groups 11+13+16 or 12+13+16. (I) is attached to the **surface** by physical adsorption or by covalent bonding, optionally through a spacer, particularly via a terminal unit.

Preparation: One end of (I) is attached to the conductive

surface, then modified by attachment of (II). Optionally (I) is hybridized to its complement and attached to the **surface** in double-stranded form, optionally together with other substances that also become attached to the **surface**

Preferred Method: In method (d), the modified conductive **surface** is contacted with a nucleic acid oligomer (III) and electrical interaction between (II) and the **surface** is detected, particularly by cyclic voltammetry, amperometry or conductivity measurements. If (III) hybridizes to attached (I), then the electrical interaction is increased.
BIOTECHNOLOGY - Preferred Nucleic Acid: (I) is able to bind, sequence-specifically, to single-stranded DNA, RNA and/or PNA (peptide nucleic acid) and is itself DNA, RNA, PNA or an oligomer with a structurally analogous backbone.

ABEX EXAMPLE - A freshly-cleaved piece of mica was coated with a 100 nm thick layer of gold. The single-stranded oligonucleotide TAGTCGGAGGCA was prepared with the following modifications, -O-CH₂CH₂SSCH₂CH₂OH esterifying the 3'-phospho group and -CH=CHCONHCH₂CH₂NH₂ attached to C5 of the 5'-terminal T residue. This was incubated with its unmodified complement to form a hybrid, and during this step, cleavage of the 3'-modifying group occurred to form a free thiol group on the oligonucleotide and 2-mercaptoethanol (2ME). The resulting solution was incubated with the gold **surface** to form a 1:1 monolayer of double-stranded oligonucleotide and 2ME. This was then reacted with a pyrrolo-quinoline quinone (PQQ), substituted by three carboxy groups, in the presence of 3-dimethylaminopropyl carbodiimide and sulfo-N-hydroxysuccinimide so that PQQ formed an amide with the modifying 5'-group.

L113 ANSWER 67 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2000-170776 [15] WPIX
 DOC. NO. CPI: C2000-053005 [15]
 DOC. NO. NON-CPI: N2000-126978 [15]
 TITLE: Photovoltaic cell used for generating electricity
 DERWENT CLASS: E23; L03; U12; V01; X16
 INVENTOR: HAGFELDT A; LINDQUIST S
 PATENT ASSIGNEE: (HAGF-I) HAGFELDT A; (LIND-I) LINDQUIST S
 COUNTRY COUNT: 82

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|------------|------|----------|-----------|----|-------|------------|
| WO 9963599 | A1 | 19991209 | (200015)* | EN | 33[7] | H01L031-04 |
| AU 9932841 | A | 19991220 | (200021) | EN | | H01L031-04 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|---------------|------|---------------|----------|
| WO 9963599 A1 | | WO 1999-SE290 | 19990301 |
| AU 9932841 A | | AU 1999-32841 | 19990301 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|--------------|----------|--------------|
| AU 9932841 A | Based on | WO 9963599 A |

PRIORITY APPLN. INFO: SE 1998-1799 19980520

INT. PATENT CLASSIF.:

MAIN: H01L031-04

SECONDARY: H01G009-20; H01M014-00

BASIC ABSTRACT:

WO 1999063599 A1 UPAB: 20060116

NOVELTY - A photovoltaic cell comprises a first and a second nano-structured working electrode and an electrolyte located between the electrodes containing a redox-couple. The working electrodes have an energy level structure and at least one electrode is a dye sensitized nano-structured electrode.

USE - The photovoltaic cell is used for generating electricity.

MANUAL CODE: CPI: E23-B; E25-E01; E25-E02; L03-E01B; L03-E01C
EPI: U12-A02A; V01-B01C; X16-D

TECH

ELECTRICAL POWER AND ENERGY - Preferred Component: The first and the second working electrodes are dye sensitized nano-structured electrodes. The second working electrode is a nano-structured **semiconductor** having a band-gap corresponding to absorption in the visible and/or infra red spectral region or a **semiconductor** having a large band-gap larger than 3 eV.

The photo-active working electrode is comprised of a particles of a **semiconductor** having a small band-gap. It has an efficient light absorption in the visible and/or infra red spectral region. The **semiconductor** in the second photo-active working electrode has a spectrum tuned against the active redox-couple in the electrolyte. The electrolyte is an **iodine-iodine** system in a polar solvent like acetonitrile. The material in the second photo-active working electrode is comprised of:

- (i) porous, nano-structured, p-doped silicon carbide;
- (ii) zinc selenide;
- (iii) nano-particles of ferric oxide; or
- (iv) nano-crystalline rods of ferric oxide.

It is sensitized with ruthenium complex of composition Ru(bpy)(Bpz)2. Its Highest Occupied Molecular Orbital (HOMO) level is below the valence band of:

- (a) silicon carbide for (i);
- (b) zinc selenide for (ii); and
- (c) ferric oxide for (iii) and (iv).

The first photo-active electrode is a nano-structured titanium oxide electrode sensitized with ruthenium bispyridine complex. The second photo-active working electrode is a nano-structured nickel oxide electrode sensitized with tetrakis(4-carboxy) **porphyrin** (TPPC).

bpy = bipyridine ligand;

Bpz = bi(1,4)diazine ligand

Preferred Method: The nano-crystalline rods of ferric oxide are anisotropically arranged with an orientation at right angles to the plane of the **substrate**.

INORGANIC CHEMISTRY - Preferred Component: The second working electrode is selected from nickel oxide, **silicon** carbide, zinc selenide and similar **semiconductors** with a large band-gap.

ORGANIC CHEMISTRY - Preferred Dye: The dye/dyes used are Erythrosin B, ((cis-bis(4,4'-dicarboxy-2,2'-bipyridine)bis(isothiocyanato)-ruthenium (II)) (N3), tetrakis(4-carboxy)**porphyrin** (TPPC) 1.

ABEX EXAMPLE - No relevant example given.

| | | |
|----------------------|--|-------------------------|
| L113 ANSWER 68 OF 72 | WPIX COPYRIGHT 2007 | THE THOMSON CORP on STN |
| ACCESSION NUMBER: | 1999-315486 [27] | WPIX |
| DOC. NO. CPI: | C1999-093389 [27] | |
| DOC. NO. NON-CPI: | N1999-235817 [27] | |
| TITLE: | Semiconductor chemical sensor for detecting chemical species in gas | |
| DERWENT CLASS: | B02; B04; D15; E19; E36; J04; K04; S03 | |
| INVENTOR: | LIVINGSTON P M | |
| PATENT ASSIGNEE: | (THOP-C) TRW INC | |
| COUNTRY COUNT: | 29 | |

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|-------------|------|----------|-----------|----|-------|------------|
| EP 921392 | A2 | 19990609 | (199927)* | EN | 13[7] | G01N027-00 |
| JP 11237357 | A | 19990831 | (199946) | JA | 39 | G01N027-22 |
| JP 2978929 | B2 | 19991115 | (199954) | JA | 9 | G01N027-22 |
| US 6077712 | A | 20000620 | (200035) | EN | | G01N027-26 |
| KR 99062777 | A | 19990726 | (200043) | KO | [7] | H01L029-84 |
| TW 442659 | A | 20010623 | (200206) | ZH | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|---------------|------|----------------|----------|
| EP 921392 A2 | | EP 1998-122560 | 19981202 |
| US 6077712 A | | US 1997-984322 | 19971203 |
| TW 442659 A | | TW 1998-119884 | 19981201 |
| JP 11237357 A | | JP 1998-344119 | 19981203 |
| JP 2978929 B2 | | JP 1998-344119 | 19981203 |
| KR 99062777 A | | KR 1998-52908 | 19981203 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|---------------|---------------|---------------|
| JP 2978929 B2 | Previous Publ | JP 11237357 A |

PRIORITY APPLN. INFO: US 1997-984322 19971203

INT. PATENT CLASSIF.:

MAIN: G01N027-00; G01N027-22; G01N027-26; H01L029-84

BASIC ABSTRACT:

EP 921392 A2 UPAB: 20050704

NOVELTY - A light source irradiates a gas with light before the gas enters the detector element at the inlet **surface** so the light source emits at least one wavelength effective to change the chemical properties of the chemical species to enhance the adsorption selectivity of the organic **semiconductor** material w.r.t. the chemical species and a unit determines the presence of the chemical species in the gas **based** on the change in capacitance in the depletion region.

DETAILED DESCRIPTION - A **semiconductor** chemical sensor for detecting a chemical species in a gas comprises:

(a) a detector element comprising an inlet **surface** and a porous layer of an organic **semiconductor** material on which the chemical species is adsorbed, which has a depletion region;

(b) a power source electrically connected to the detector element to produce a bias voltage in the element so that the chemical species percolates through the porous layer and into the depletion region under the bias voltage to change the capacitance of the detector element;

(c) a light source to irradiate the gas with light before the gas enters the detector element at the inlet **surface** so the light source emits at least one wavelength effective to change the chemical properties of the chemical species so as to enhance the adsorption selectivity of the organic **semiconductor** material with respect to the chemical species; and

(d) means for determining the presence of the chemical species in the gas **based** on the change in capacitance in the depletion region.

An INDEPENDENT CLAIM is also included for the detection of a chemical species in a gas.

USE - The sensor is used for environmental monitoring of toxic chemicals, e.g. trichloroethylene in air, soil and ground water; determining the status of equipment such as transformers, turbines and airplanes; internal combustion engine exhaust gas analysis of oxygen, nitrogen dioxide and hydrocarbons; locating illegal drugs such as cocaine, explosives and drug manufacturing at portals in airports and by portable monitoring; inexpensive sensors for home hazards such as carbon monoxide and natural gas; critical monitoring of chemical processes including material separation, manufacturing and waste stream control; in vivo sensing of chemical concentrations of ions, pH, pO₂, pCO₂ and glucose; and research on complex chemical reactions.

ADVANTAGE - The sensor is portable and so can be used for field testing applications. Very low concentrations of specific chemicals can be detected at a high degree of chemical specificity.

DESCRIPTION OF DRAWINGS - The drawing is a sectional view of a **semiconductor** chemical sensor.

Detector (10)
Metal Electrode (12)
Organic Semiconductor (14)
Porous Electrode (16)
First Interface (18)
Second Interface (20)
Depletion Region (22)
Front (24)
Ohmic Contact (26)
Outer Surface (28)
Ohmic Contact (30)
Outer Inlet Surface (32)
Power Source (34)

MANUAL CODE: CPI: B04-A04; B05-C02; B05-C08; B10-A07;
B10-H02F; B10-J01; B10-J02; B11-C08; B12-K04E;
D04-A01H; E06-D04; E10-J02D; E11-Q03; E31-D02;
E31-H05; E31-N05B; J04-C04; K04-F
EPI: S03-E02; S03-E02C

Member(0002)

ABEQ JP 11237357 A UUPAB 20050704

NOVELTY - A light source irradiates a gas with light before the gas enters the detector element at the inlet **surface** so the light source emits at least one wavelength effective to change the chemical properties of the chemical species to enhance the adsorption selectivity of the organic **semiconductor** material w.r.t. the chemical species and a unit determines the presence of the chemical species in the gas based on the change in capacitance in the depletion region.

DETAILED DESCRIPTION - A **semiconductor** chemical sensor for detecting a chemical species in a gas comprises:

(a) a detector element comprising an inlet **surface** and a porous layer of an organic **semiconductor** material on which the chemical species is adsorbed, which has a depletion region;

(b) a power source electrically connected to the detector element to produce a bias voltage in the element so that the chemical species percolates through the porous layer and into the depletion region under the bias voltage to change the capacitance of the detector element;

(c) a light source to irradiate the gas with light before the gas enters the detector element at the inlet **surface** so the light source emits at least one wavelength effective to change the chemical properties of the chemical species so as to enhance the adsorption selectivity of the organic **semiconductor** material with respect to the chemical species; and

(d) means for determining the presence of the chemical species in the gas based on the change in capacitance in the depletion region.

An INDEPENDENT CLAIM is also included for the detection of a chemical species in a gas.

USE - The sensor is used for environmental monitoring of toxic chemicals, e.g. trichloroethylene in air, soil and ground water; determining the status of equipment such as transformers, turbines and airplanes; internal combustion engine exhaust gas analysis of oxygen, nitrogen dioxide and hydrocarbons; locating illegal drugs such as cocaine, explosives and drug manufacturing at portals in airports and by portable monitoring; inexpensive sensors for home hazards such as carbon monoxide and natural gas; critical monitoring of chemical processes including material separation, manufacturing and waste stream control; in vivo sensing of chemical concentrations of ions, pH, pO₂, pCO₂ and glucose; and research on complex chemical reactions.

ADVANTAGE - The sensor is portable and so can be used for

field testing applications. Very low concentrations of specific chemicals can be detected at a high degree of chemical specificity.

DESCRIPTION OF DRAWINGS - The drawing is a sectional view of a **semiconductor** chemical sensor.

Detector (10)
 Metal Electrode (12)
 Organic **Semiconductor** (14)
 Porous Electrode (16)
 First Interface (18)
 Second Interface (20)
 Depletion Region (22)
 Front (24)
 Ohmic Contact (26)
 Outer **Surface** (28)
 Ohmic Contact (30)
 Outer Inlet **Surface** (32)
 Power Source (34)

Member(0003)

ABEQ JP 2978929 B2 UPAB 20050704

NOVELTY - A light source irradiates a gas with light before the gas enters the detector element at the inlet **surface** so the light source emits at least one wavelength effective to change the chemical properties of the chemical species to enhance the adsorption selectivity of the organic **semiconductor** material w.r.t. the chemical species and a unit determines the presence of the chemical species in the gas based on the change in capacitance in the depletion region.

DETAILED DESCRIPTION - A **semiconductor** chemical sensor for detecting a chemical species in a gas comprises:

(a) a detector element comprising an inlet **surface** and a porous layer of an organic **semiconductor** material on which the chemical species is adsorbed, which has a depletion region;

(b) a power source electrically connected to the detector element to produce a bias voltage in the element so that the chemical species percolates through the porous layer and into the depletion region under the bias voltage to change the capacitance of the detector element;

(c) a light source to irradiate the gas with light before the gas enters the detector element at the inlet **surface** so the light source emits at least one wavelength effective to change the chemical properties of the chemical species so as to enhance the adsorption selectivity of the organic **semiconductor** material with respect to the chemical species; and

(d) means for determining the presence of the chemical species in the gas based on the change in capacitance in the depletion region.

An INDEPENDENT CLAIM is also included for the detection of a chemical species in a gas.

USE - The sensor is used for environmental monitoring of toxic chemicals, e.g. trichloroethylene in air, soil and ground water; determining the status of equipment such as transformers, turbines and airplanes; internal combustion engine exhaust gas analysis of oxygen, nitrogen dioxide and hydrocarbons; locating illegal drugs such as cocaine, explosives and drug manufacturing at portals in airports and by portable monitoring; inexpensive sensors for home hazards such as carbon monoxide and natural gas; critical monitoring of chemical processes including material separation, manufacturing and waste stream control; in vivo sensing of chemical concentrations of ions, pH, pO₂, pCO₂ and glucose; and research on complex chemical reactions.

ADVANTAGE - The sensor is portable and so can be used for field testing applications. Very low concentrations of specific chemicals can be detected at a high degree of chemical

specificity.

DESCRIPTION OF DRAWINGS - The drawing is a sectional view of a **semiconductor** chemical sensor.

Detector (10)
 Metal Electrode (12)
Organic Semiconductor (14)
 Porous Electrode (16)
 First Interface (18)
 Second Interface (20)
 Depletion Region (22)
 Front (24)
 Ohmic Contact (26)
Outer Surface (28)
 Ohmic Contact (30)
Outer Inlet Surface (32)
 Power Source (34)

Member (0004)

ABEQ US 6077712 A UPAB 20050704

NOVELTY - A light source irradiates a gas with light before the gas enters the detector element at the inlet **surface** so the light source emits at least one wavelength effective to change the chemical properties of the chemical species to enhance the adsorption selectivity of the organic **semiconductor** material w.r.t. the chemical species and a unit determines the presence of the chemical species in the gas based on the change in capacitance in the depletion region.

DETAILED DESCRIPTION - A **semiconductor** chemical sensor for detecting a chemical species in a gas comprises:

(a) a detector element comprising an inlet **surface** and a porous layer of an organic **semiconductor** material on which the chemical species is adsorbed, which has a depletion region;

(b) a power source electrically connected to the detector element to produce a bias voltage in the element so that the chemical species percolates through the porous layer and into the depletion region under the bias voltage to change the capacitance of the detector element;

(c) a light source to irradiate the gas with light before the gas enters the detector element at the inlet **surface** so the light source emits at least one wavelength effective to change the chemical properties of the chemical species so as to enhance the adsorption selectivity of the organic **semiconductor** material with respect to the chemical species; and

(d) means for determining the presence of the chemical species in the gas based on the change in capacitance in the depletion region.

An INDEPENDENT CLAIM is also included for the detection of a chemical species in a gas.

USE - The sensor is used for environmental monitoring of toxic chemicals, e.g. trichloroethylene in air, soil and ground water; determining the status of equipment such as transformers, turbines and airplanes; internal combustion engine exhaust gas analysis of oxygen, nitrogen dioxide and hydrocarbons; locating illegal drugs such as cocaine, explosives and drug manufacturing at portals in airports and by portable monitoring; inexpensive sensors for home hazards such as carbon monoxide and natural gas; critical monitoring of chemical processes including material separation, manufacturing and waste stream control; in vivo sensing of chemical concentrations of ions, pH, pO₂, pCO₂ and glucose; and research on complex chemical reactions.

ADVANTAGE - The sensor is portable and so can be used for field testing applications. Very low concentrations of specific chemicals can be detected at a high degree of chemical specificity.

DESCRIPTION OF DRAWINGS - The drawing is a sectional view

of a **semiconductor** chemical sensor.

- Detector (10)
- Metal Electrode (12)
- Organic Semiconductor** (14)
- Porous Electrode (16)
- First Interface (18)
- Second Interface (20)
- Depletion Region (22)
- Front (24)
- Ohmic Contact (26)
- Outer **Surface** (28)
- Ohmic Contact (30)
- Outer Inlet **Surface** (32)
- Power Source (34)

TECH

ELECTRONICS - Preferred Sensor: The metal electrode is porous and the detector element comprises a metal electrode forming a first interface with the porous layer and a porous electrode of an **inorganic semiconductor** material forming a second interface with the porous layer, where the porous electrode includes the inlet **surface**. The organic **semiconductor** is an n-type **semiconductor** and the mesh electrode comprises a heavily doped n-type silicon material. The light source is a laser diode. Specifically the chemical species is cocaine and the organic **semiconductor** material is a **phthalocyanine** molecule.

L113 ANSWER 69 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 1993-216318 [27] WPIX
 DOC. NO. CPI: C1993-095957 [27]
 DOC. NO. NON-CPI: N1993-166252 [27]
 TITLE: Optical recording **disc** applicable for
 CD or CD-ROM format signals - composed of
 substrate, recording layer containing nitro
 gp.-containing **silicon**
 phthalocyanine cpd., reflector layer and
 protective film
 DERWENT CLASS: A89; E12; G06; L03; P75; T03; W04
 INVENTOR: MIYAZAKI S; SAKAMOTO M
 PATENT ASSIGNEE: (TOXW-C) TOYO INK MFG CO
 COUNTRY COUNT: 1

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|-------------|------|----------|-----------|----|-------|------------|
| JP 05139044 | A | 19930608 | (199327)* | JA | 15[0] | B41M005-26 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-------------|------|----------------|----------|
| JP 05139044 | A | JP 1991-326997 | 19911115 |

PRIORITY APPLN. INFO: JP 1991-326997 19911115

INT. PATENT CLASSIF.:

IPC RECLASSIF.: B41M0005-26 [I,A]; B41M0005-26 [I,C]; G11B0007-24
 [I,A]; G11B0007-24 [I,C]; G11B0007-244 [I,A]

BASIC ABSTRACT:

JP 05139044 A UPAB: 20060107

The **disk** is fabricated by coating a transparent **substrate** with a recording layer, a reflector layer and protective film layer. The recording layer is composed of at least one nitro gp.-containing **silicon phthalocyanine** cpd. of formula (I), where X1-X4 is fluorinated alkoxy group; and R is fluorinated opt. branched alkyl or fluorinated cycloalkyl gp.

ADVANTAGE - The **disk** permits stable recording and reproduction with

semiconductor laser beam (wavelength 770-800nm). The **silicon phthalocyanine** cpd. (I) offers improved recording sensitivity with minimised wavelength dependence. - In an example, a 1.20mm thick polycarbonate **disk** having guide grooves was spin coated with 60 mg/ml solution of (I) ($X_1=X_2=X_3=X_4=-OCH_2(CF_2)_2H$; and $R=-CF_3$) in diacetone **alcohol** to form 1500 Angstrom thick recording layer. On the recording layer, 800 Angstrom thick vacuum evaporated gold layer and 5 microns thick protective layer composed of UV setting resin were formed in this order. MANUAL CODE:

CPI: A12-L03C; E23-B; G06-A; G06-A08; G06-C06;
G06-D07; G06-F05; L03-G04B
EPI: T03-B01B1; T03-B01D1; W04-C01B

L113 ANSWER 70 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 1992-263107 [32] WPIX
 DOC. NO. CPI: C1992-117333 [21]
 DOC. NO. NON-CPI: N1992-201194 [21]
 TITLE: **Phthalocyanine** cpds., used for dyes for write-once optical discs - obtd. by reacting a metal **phthalocyanine** with **halogenated silicon** cpd. in the presence of organic base
 DERWENT CLASS: E12; E23; G06; L03; P75; T03; W04
 INVENTOR: KATAI S; MARUYAMA K; SATO T
 PATENT ASSIGNEE: (IDEM-C) IDEMITSU PETROCHEM CO; (RICO-C) RICOH KK
 COUNTRY COUNT: 1

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|-------------|------|--------------------|---------|----|----|------------|
| JP 04178468 | A | 19920625 (199232)* | JA 7[0] | | | C09B047-22 |
| JP 3024998 | B2 | 20000327 (200020) | JA 9 | | | C09B047-22 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|---------------|------|----------------|----------|
| JP 04178468 A | | JP 1990-306032 | 19901114 |
| JP 3024998 B2 | | JP 1990-306032 | 19901114 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|---------------|---------------|---------------|
| JP 3024998 B2 | Previous Publ | JP 04178468 A |

PRIORITY APPLN. INFO: JP 1990-306032 19901114

INT. PATENT CLASSIF.:

IPC RECLASSIF.: B41M0005-26 [I,A]; B41M0005-26 [I,C]; C09B0047-04 [I,C]; C09B0047-22 [I,A]; G11B0007-24 [I,A]; G11B0007-24 [I,C]; G11B0007-244 [I,A]

BASIC ABSTRACT:

JP 04178468 A UPAB: 20050504

A **phthalocyanine** cpd. of formula (I) is new, where M= tri- or tetravalent metal, each $X_1-X_8=H$ or amino, X_1 is not = X_2 , X_3 is not = X_4 , X_5 is not = X_6 , X_7 is not = X_8 , Y= $-OSiR_1R_2R_3$, each R_1-R_3 =identical or different alkyl, substd. alkyl, aryl, substd. aryl, aralkyl, substs. aralkyl, alkoxy, substd. alkoxy, aryloxy, substd. aryloxy, polyether, substd. polyether, **hydroxyl** or H and n=the number of Y of 1-2.

In preparation of (I) a cpd. of formula (II) and a **halogenated silicon** cpd. of formula $XSiR_1R_2R_3m$, where X=halogen, are reacted in the presence of an organic basic cpd. to give a **phthalocyanine** cpd. of formula (I).

USE/ADVANTAGE - The **phthalocyanine** cpds. have absorptions in the **semiconductor** laser oscillating wavelength region and are soluble in general organic solvents and useful as organic dyes for wire-once optical **disks** and the method can manufacture the **phthalocyanine** cpds. effectively. - =h

MANUAL CODE: CPI: E23-B; G06-C06; G06-D07; G06-F05; L03-G04B
EPI: T03-B01B1; W04-C01B

ABEQ JP 3024998 B2 UPAB 20050504

A phthalocyanine cpd. of formula (I) is new, where M= tri- or tetravalent metal, each X1-8=H or amino, X1 is not = X2, X3 is not= X4, X5 is not=X6, X7 is not=X8, Y= -OSiR1R2R3, each R1-3=identical or different alkyl, substd. alkyl, aryl, substd. aryl, aralkyl, substs. aralkyl, alkoxy, substd. alkoxy, aryloxy, substd. aryloxy, polyether, substd. polyether, hydroxyl or H and n=the number of Y of 1-2.

In prepn. of (I) a cpd. of formula (II) and a halogenated silicon cpd. of formula XSiR1R2R3m, where X=halogen, are reacted in the presence of an organic basic cpd. to give a phthalocyanine cpd. of formula (I).

USE/ADVANTAGE - The phthalocyanine cpds. have absorptions in the semiconductor laser oscillating wavelength region and are soluble in general organic solvents and useful as organic dyes for wire-once optical discs and the method can manufacture the phthalocyanine cpds. effectively. - =h

L113 ANSWER 71 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 1989-301770 [42] WPIX
 DOC. NO. CPI: C1989-133413 [21]
 DOC. NO. NON-CPI: N1989-230103 [21]
 TITLE: RTV electroconductive silicone rubber
 compsn. - comprises organo:polysiloxane containing metal oxide or fibres, crosslinker, crosslinking catalyst and organic solvent
 DERWENT CLASS: A26; A85; G04; L03; Q43; Q45; U11; X12
 INVENTOR: NAGAOKA H
 PATENT ASSIGNEE: (TSIL-C) TOSHIBA SILICONE KK
 COUNTRY COUNT: 6

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|-------------|------|----------|-----------|----|------|------------|
| DE 3909753 | A | 19891012 | (198942)* | DE | 7[0] | |
| GB 2216894 | A | 19891018 | (198942) | EN | | |
| NL 8900780 | A | 19891101 | (198946) | NL | | |
| FR 2629466 | A | 19891006 | (198947) | FR | | |
| JP 01287169 | A | 19891117 | (199001) | JA | | C08L083-06 |
| GB 2216894 | B | 19920108 | (199202) | EN | | |
| NL 189263 | B | 19920916 | (199240) | NL | 9[0] | C08L083-04 |
| DE 3909753 | C2 | 19930325 | (199312) | DE | 7[0] | C08L083-06 |
| US 5217651 | A | 19930608 | (199324) | EN | 6[0] | H01B001-00 |
| JP 05039985 | B | 19930616 | (199327) | JA | 4 | C08L083-06 |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|---------------|------|-----------------|----------|
| DE 3909753 A | | DE 1989-3909753 | 19890323 |
| FR 2629466 A | | FR 1988-4421 | 19880331 |
| JP 01287169 A | | JP 1988-80456 | 19880401 |
| JP 05039985 B | | JP 1988-80456 | 19880401 |
| DE 3909753 C2 | | DE 1989-3909753 | 19890323 |
| GB 2216894 A | | GB 1989-6939 | 19890328 |
| NL 189263 B | | NL 1989-780 | 19890330 |
| US 5217651 A | | US 1989-331206 | 19890331 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|---------------|----------|---------------|
| JP 05039985 B | Based on | JP 01287169 A |

PRIORITY APPLN. INFO: JP 1988-80456 19880401

INT. PATENT CLASSIF.:

MAIN: C08L083-06
 IPC RECLASSIF.: C08K0013-00 [I,C]; C08K0013-02 [I,A]; C08K0003-00 [I,C]; C08K0003-22 [I,A]; C08K0005-00 [I,A]; C08K0005-00 [I,C]; C08K0007-00 [I,C]; C08K0007-08 [I,A]; C08L0083-00 [I,C]; C08L0083-04 [I,A]; C08L0083-06 [I,A]; C09C0001-36 [I,A]; C09C0001-36 [I,C]; C09K0003-10 [I,A]; C09K0003-10 [I,C]; C09K0003-12 [I,A]; C09K0003-12 [I,C]; E04F0013-02 [I,A]; E04F0013-02 [I,C]

BASIC ABSTRACT:

DE 3909753 A UPAB: 20050429

RIV electroconductive **silicone** rubber compsn. consists of 100 (weight) pts. organopolysiloxane (I) containing at least 2 Si-bound OH and/or alkoxy gps. in the mol., 10-950 pts. white, pale or brightly coloured electroconductive metal oxide powder or fibres (II), 0.1-30 pts. crosslinker (III), 0-5 pts. crosslinking catalyst (IV) and 1-500 pts. volatile organic solvent (V).

USE/ADVANTAGE - The compsn. has **semiconducting** properties, which are stable for long periods. It is useful as sealant in clean rooms used in the mfr. of electronic machines and equipment, including computers and **semiconductors**, e.g. ICs and LSIs. Its colour suits the decor of these rooms better than the usual black or brown sealants. - In an example 483 pts. blue-grey TiO₂ with an average dia. of 0.1 micron, **surface** treated with Sb₂O₃-SnO₂, were incorporated in 100 pts. alpha,omega-dihydroxy 6dimethylpolysiloxane (viscosity 5000 cSt at 25 deg. C), then (A) 25, (B) 0 pts. xylene, 12.2 pts. methyltris(methylethyl ketoxime)silane (IIIA) and 0.10 pt. dibutyl-Sn dilaurate (IVA) were added and the mixture was kneaded under reduced pressure, (B) being the control. Half the sample was cured 7 days at 20 deg. C and 55% RH to give a 2 mm thick sheet with a **surface** resistance of (A) 2 x 10^{power}6, (B) 1 x 10^{power}10 ohm. The other half was kept in an air-tight package at room temperature for 6 months before cure, which gave a prod. with a **surface** resistance of (A) 3 x 10^{power}7, (B) 6 x 10^{power} 16 ohm. All samples were blue-grey in colour. MANUAL CODE: CPI: A06-A00E2; A08-M09A; A09-A03; A12-E;

A12-R08; G04-B02; L03-A02E; L04-D10

EPI: U11-C15; X12-D01C

Member(0007)

ABEQ NL 189263 B UPAB 20050429

Polysiloxane rubber compsn. of the type vulcanising at room temp. contains (A) 100 pts.wt. of organopolysiloxane with at least 2 OH and/or alkoxy gps. linked to Si, (B) 0.1-30 pts. of cross-linking agent, (C) 0-5 pts. of cross-linking catalyst, (D) 1-500 pts. of volatile organic solvent, and (E) 10-850 (50-700) pts. of powdery or fibrous electrically conducting material of metal oxide type, with white or light, pale colour.

USE/ADVANTAGE - The compsn. is **used** to seal joints in the antistatic walls and floors of clean rooms in which electronic machines and appts., including computers, contg. **semiconductors**, are assembled. The compsn. has **permanent**, stable, semiconductor properties, and a white or pale colour, with no discolouration

Member(0008)

ABEQ DE 3909753 C2 UPAB 20050429

Semiconducting silicone **rubber** compsn. that can be vulcanised at room temp. comprises an organopolysiloxane (100 pts.wt.) contg. two or more OH and/or alkoxy gps. linked to Si; a white or light-coloured lustrous powdered or fibrous semiconducting metal oxide (10-850 pts.wt.), e.g. K titanate or TiO₂ that have been surface-impregnated with Sb₂O₃ and SnO₂; a crosslinking agent (0.1-30 pts.wt.); a volatile organic solvent (1-500 pts.wt.); and opt. a crosslinking catalyst (0.5 pts.wt.).

USE - The prods. are resins for the construction of electronic and computer equipment, having the property of reducing the accumulation of electrostatic charge by **semiconduction**

Member(0009)

ABEQ US 5217651 A UPAB 20050429

A room **temp.** vulcanising electroconductive silicone

rubber compsn. comprises (A) 100 pts.wt. of a straight chain organopolysiloxane having in one of its molecules at least two hydroxyl gps. at least two alkoxy, or a combination of at least one hydroxyl and at least one alkoxy gp.. The hydroxyl and alkoxy gps. bonded to the Si atoms at the ends of the molecule; (B) 20-850 pts.wt. of a powdery or fibrous metallic oxide electroconductive material showing a white or light and bright colour such as potassium titanate surface-treated with antimony oxide-tin oxide or titanium oxide surface-treated with antimony oxide-tin oxide; (C) 0.1-30 pts.wt. of a crosslinking agent; (D) 0 to 5 pts.wt. of a crosslinking catalyst; (E) 1-500 pts.wt. of a volatile organic solvent having a b.pt. of 30-300 deg.C.

USE/ADVANTAGE - The compsn. can cold cure to form a rubber-like elastomer showing a white colour or a light and bright colour and has a stable semiconducting properties over a long period of time.

Member(0010)

ABEQ JP 93039985 B UPAB 20050429

Addn. of **surfactants** into the reaction mixt. and below 500 pts.wt. use of solvents on 100 pts.wt. of tetra-halogenated phthalic acid cpds. is new. Reaction mixt. consisting of tetra-halogenated phthalic acid cpds., N sources (e.g., urea), catalysts, and solvents is heated. Surfactants are nonionic, cationic, anionic, and amphoretic type surfactants. Anion type surfactants are (e.g., alkyl benzene sulphonates, formalin condens. prods. of naphthalene sulphonate, and lauryl sulphate type surfactants). Addn. of surfactants is pref. at 0.10-10 pts.wt. w.r.t. 100 pts.wt. of reaction mixt. Tetrachlorophthalic acid, tetrachlorophthalic anhydride, tetrabromophthalic acid, and tetrabromophthalic anhydride are pref. tetra-halogenated phthalic acid cpds.

ADVANTAGE - Addn. of surfactants gives high yields and high purity of poly-halogenated Cu **phthalocyanine** (i.e. Cu **phthalocyanine** green pigment Cu with reduced amt. of solvents required. Poly-halogenated Cu **phthalocyanine** directly prep'd. from poly-halogenated phthalic acid cpds. can replace conventional after-halogenation of Cu **phthalocyanine**.

(J62101660-A)

L113 ANSWER 72 OF 72 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 1987-325691 [46] WPIX
 DOC. NO. CPI: C1987-139102 [21]
 DOC. NO. NON-CPI: N1987-243563 [21]
 TITLE: Optical information recording medium - containing substd. silicon naphthalo:cyanine cpd., used especially for laser recording with gallium aluminium arsenide **semiconductor** laser
 DERWENT CLASS: A89; E11; E23; G06; P75; T03; W04
 INVENTOR: MORIKAWA K; SHIBANO H; YAMAZAKI H
 PATENT ASSIGNEE: (KAOS-C) KAO CORP
 COUNTRY COUNT: 1

PATENT INFORMATION:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|-------------|------|----------|-----------|----|------|----------|
| JP 62233287 | A | 19871013 | (198746)* | JA | 4[0] | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|---------------|------|---------------|----------|
| JP 62233287 A | | JP 1986-75980 | 19860402 |

10/0400059

PRIORITY APPLN. INFO: JP 1986-75980 19860402

INT. PATENT CLASSIF.:

IPC RECLASSIF.: B41M0005-26 [I,A]; B41M0005-26 [I,C]; G11B0007-24
[I,C]; G11B0007-244 [I,A]

BASIC ABSTRACT:

JP 62233287 A UPAB: 20050426

Medium contains an information-recording layer containing (a) **silicon naphthalocyanine** cpd. of formula (I), on a baseplate.

In (I), R and R' = 1-20C alkyl, alkenyl, aromatic hydrocarbon, acyl or trisubstd. silyl; one of the Si- O bonds projects outward of the paper plane and the other behind it; R and R' may be the same; R1, R2, R3 and R4 = H, halogen, 1-20C (un)substd. alkyl or alkenyl and may be the same; a, b, c and d = integer of each 1-4 and may be the same.

USE/ADVANTAGE - The recording medium can be recorded and reproduced by laser beam, pref. Ga-Al-As **semiconductor** laser. Cpd. (a) can be dissolved in organic solvents, e.g., halogenated hydrocarbons, aromatic hydrocarbons, ketones, etc. and easily forms a thin film on suitable **bases**. The thin film has high sensitivity and suitable absorption spectrum to light in the near infrared region. MANUAL CODE: CPI: A12-L03C; E23-B; G06-C06; G06-D07; G06-F05

EPI: T03-B01B; W04-C01

=> => d que 1112

L2 QUE ABB=ON PLU=ON BOCIAN D?/AU
 L3 QUE ABB=ON PLU=ON KUHR W?/AU
 L4 QUE ABB=ON PLU=ON LINDSEY J?/AU
 L5 QUE ABB=ON PLU=ON DABKE R?/AU
 L6 QUE ABB=ON PLU=ON LIU Z?/AU
 L7 QUE ABB=ON PLU=ON LIU ZHIMING?/AU
 L8 QUE ABB=ON PLU=ON (L2 OR L3 OR L4 OR L5) OR L7
 L10 4 SEA FILE=HCAPLUS ABB=ON PLU=ON L2 AND L3 AND L4 AND
 L5 AND L6
 L50 171851 SEA FILE=HCAPLUS ABB=ON PLU=ON (SEMICONDUCT? OR
 SEMI(W) CONDUCT?) AND (SILICON? OR GROUP(W) (IV OR 4))
 L51 1 SEA FILE=REGISTRY ABB=ON PLU=ON SILICON/CN
 L52 1 SEA FILE=REGISTRY ABB=ON PLU=ON PORPHYRIN/CN
 L53 1 SEA FILE=REGISTRY ABB=ON PLU=ON PHTHALOCYANINE/CN
 L54 1 SEA FILE=REGISTRY ABB=ON PLU=ON CHLORIN/CN
 L55 1 SEA FILE=REGISTRY ABB=ON PLU=ON HEMIN/CN
 L56 QUE ABB=ON PLU=ON L51 OR SILICON OR SI
 L57 632 SEA FILE=HCAPLUS ABB=ON PLU=ON L52/D OR L52/DP
 L58 2851 SEA FILE=HCAPLUS ABB=ON PLU=ON L53/D OR L53/DP
 L59 119 SEA FILE=HCAPLUS ABB=ON PLU=ON L54/D OR L54/DP
 L60 220 SEA FILE=HCAPLUS ABB=ON PLU=ON L55/D OR L55/DP
 L61 82774 SEA FILE=HCAPLUS ABB=ON PLU=ON PORPHYRINS+PFT,OLD,NT/
 CT
 L62 8102 SEA FILE=HCAPLUS ABB=ON PLU=ON PHTHALOCYANINE+PFT,OLD
 ,NT/CT
 L63 82774 SEA FILE=HCAPLUS ABB=ON PLU=ON L61 OR L62
 L64 458816 SEA FILE=HCAPLUS ABB=ON PLU=ON SILICON+PFT,OLD,NT/CT

 L65 QUE ABB=ON PLU=ON ?PORPHYRIN? OR ?PORPHIN? OR CHLOR
 IN OR HEMIN? OR ?PHTHALOCYAN?
 L66 QUE ABB=ON PLU=ON (DOPE# OR DOPING? OR DOPANT?) (L) ((
 N OR P) (L) TYPE)
 L67 QUE ABB=ON PLU=ON PASSIVATION+PFT,OLD,NT/CT
 L70 QUE ABB=ON PLU=ON SUBSTRAT? OR SURFACE? OR BASE# OR
 SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR FOUNDATION
 ? OR PANE? OR DISK? OR DISC# OR WAFER? OR PLATE OR PLAT
 ES
 L71 QUE ABB=ON PLU=ON OXYGEN OR O
 L72 QUE ABB=ON PLU=ON (HALOGENAT? OR IODIN? OR BROMIN? O
 R CHLORIN? OR FLUORIN?)
 L73 QUE ABB=ON PLU=ON (HYDROGEN OR H) (L) (PASSIVAT? OR L3
 73)
 L74 QUE ABB=ON PLU=ON L56 OR L64
 L75 5118 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L74 AND ((L57
 OR L58 OR L59 OR L60) OR L66 OR L63)
 L76 3618 SEA FILE=HCAPLUS ABB=ON PLU=ON L75 AND L70
 L77 421250 SEA FILE=HCAPLUS ABB=ON PLU=ON L74 (L) L70
 L78 2919 SEA FILE=HCAPLUS ABB=ON PLU=ON L76 AND L77
 L79 2882 SEA FILE=HCAPLUS ABB=ON PLU=ON L78 AND L66
 L80 QUE ABB=ON PLU=ON (L56(A)L71) (3A) BOND?
 L81 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L79 AND L80
 L82 94 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L74 AND ((L57
 OR L58 OR L59 OR L60) OR L63)
 L83 59 SEA FILE=HCAPLUS ABB=ON PLU=ON L82 AND L70
 L84 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L83 AND L66
 L88 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L76 AND L80
 L89 QUE ABB=ON PLU=ON (L56(A)L71) (L) BOND?
 L90 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L78 AND L89
 L93 QUE ABB=ON PLU=ON (L56(A)L71) (2A) BOND?
 L95 186319 SEA FILE=HCAPLUS ABB=ON PLU=ON (SEMICONDUCT? OR
 SEMI(W) CONDUCT?) AND L74
 L96 350 SEA FILE=HCAPLUS ABB=ON PLU=ON L95 AND ((L57 OR L58
 OR L59 OR L60 OR L61 OR L62 OR L63) OR L65)
 L97 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND L80

L98 252 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND L70
 L99 187 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND L77
 L100 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L99 AND L66
 L101 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L98 AND L66
 L102 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L99 AND L72
 L103 4 SEA FILE=HCAPLUS ABB=ON PLU=ON L99 AND L73
 L104 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L96 AND L93
 L106 20 SEA FILE=HCAPLUS ABB=ON PLU=ON L81 OR L84 OR L88 OR
 L90 OR L97 OR (L100 OR L101 OR L102 OR L103 OR L104)
 L107 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L99 AND (COAT? OR
 FILM?) AND (BASE OR BASIC)
 L108 31 SEA FILE=HCAPLUS ABB=ON PLU=ON L106 OR L107
 L109 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L8 AND L108
 L111 11 SEA FILE=HCAPLUS ABB=ON PLU=ON L8 AND L96
 L112 13 SEA FILE=HCAPLUS ABB=ON PLU=ON L109 OR L111 OR L10

=> d que 147

L2 QUE ABB=ON PLU=ON BOCIAN D?/AU
 L3 QUE ABB=ON PLU=ON KUHR W?/AU
 L4 QUE ABB=ON PLU=ON LINDSEY J?/AU
 L5 QUE ABB=ON PLU=ON DABKE R?/AU
 L7 QUE ABB=ON PLU=ON LIU ZHIMING?/AU
 L8 QUE ABB=ON PLU=ON (L2 OR L3 OR L4 OR L5) OR L7
 L12 689 SEA L8
 L18 667 SEA (SEMICONDUCT? OR SEMI(W) CONDUCT?) AND PORPHYRIN?
 L19 438489 SEA (SEMICONDUCT? OR SEMI(W) CONDUCT?) AND (SILICON?
 OR GROUP(W) (IV OR 4))
 L20 81 SEA L18 AND L19
 L21 16 SEA L20 AND (MONOLAYER? OR MONO(W) LAYER? OR SELF(N)
 ASSEMBL?)
 L22 61 SEA L20 AND (SUBSTRAT? OR SURFACE? OR BASE# OR
 SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR FOUNDATION
 ? OR PANE? OR DISK? OR DISC# OR WAFER? OR PLATE OR
 PLATES)
 L23 3 SEA L22 AND PASSIVAT?
 L24 5139 SEA (SEMICONDUCT? OR SEMI(W) CONDUCT?) AND (?PORPHYRIN?
 OR ?PORPHIN? OR CHLORIN OR HEMIN? OR ?PHTHALOCYAN?)
 L25 581 SEA L24 AND L19
 L26 455 SEA L25 AND (SUBSTRAT? OR SURFACE? OR BASE# OR
 SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR FOUNDATION
 ? OR PANE? OR DISK? OR DISC# OR WAFER? OR PLATE OR
 PLATES)
 L27 56 SEA L26 AND (MONOLAYER? OR MONO(W) LAYER? OR SELF(N)
 ASSEMBL?)
 L28 54 SEA L26 AND (HALOGENAT? OR IODIN? OR BROMIN? OR
 CHLORIN? OR FLUORIN?)
 L29 3 SEA L26 AND (DOPE# OR DOPING? OR DOPANT?) (6N)((N OR
 P)(3N) TYPE)
 L30 62 SEA L26 AND (DOPE# OR DOPING? OR DOPANT?)
 L31 53 SEA L26 AND ((N OR P)(3N) TYPE)
 L32 14 SEA L30 AND L31
 L33 188 SEA (L27 OR L28 OR L29 OR L30 OR L31 OR L32)
 L34 189 SEA L33 OR L21 OR L23
 L35 49 SEA L34 AND (ALCOHOL? OR OH OR HYDROXY?)
 L36 2 SEA L35 AND (((SILICON OR SI)(N)(OXYGEN OR O))(3N)
 BOND?)
 L37 3 SEA L26 AND (((SILICON OR SI)(N)(OXYGEN OR O))(3N)
 BOND?)
 L39 9 SEA L23 OR L29 OR (L36 OR L37)
 L42 22 SEA L27 AND (L28 OR L30 OR L31 OR L35)
 L43 14 SEA L28 AND (L30 OR L31)
 L44 16 SEA L28 AND L35
 L45 35 SEA L39 OR L43 OR L44
 L46 52 SEA L45 OR L42
 L47 7 SEA L46 AND L12

=> d que 149

L2 QUE ABB=ON PLU=ON BOCIAN D?/AU
 L3 QUE ABB=ON PLU=ON KUHR W?/AU
 L4 QUE ABB=ON PLU=ON LINDSEY J?/AU
 L5 QUE ABB=ON PLU=ON DABKE R?/AU
 L7 QUE ABB=ON PLU=ON LIU ZHIMING?/AU
 L8 QUE ABB=ON PLU=ON (L2 OR L3 OR L4 OR L5) OR L7
 L12 689 SEA L8
 L13 39 SEA (SEMICONDUCT? OR SEMI(W) CONDUCT?) AND L12
 L14 19 SEA L13 AND PORPHYRIN?
 L15 21 SEA L13 AND (SILICON? OR GROUP(W) (IV OR 4))
 L17 27 SEA L14 OR L15
 L18 667 SEA (SEMICONDUCT? OR SEMI(W) CONDUCT?) AND PORPHYRIN?
 L19 438489 SEA (SEMICONDUCT? OR SEMI(W) CONDUCT?) AND (SILICON?
 OR GROUP(W) (IV OR 4))
 L20 81 SEA L18 AND L19
 L21 16 SEA L20 AND (MONOLAYER? OR MONO(W) LAYER? OR SELF(N)
 ASSEMBL?)
 L22 61 SEA L20 AND (SUBSTRAT? OR SURFACE? OR BASE# OR
 SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR FOUNDATION
 ? OR PANE? OR DISK? OR DISC# OR WAFER? OR PLATE OR
 PLATES)
 L23 3 SEA L22 AND PASSIVAT?
 L24 5139 SEA (SEMICONDUCT? OR SEMI(W) CONDUCT?) AND (?PORPHYRIN?
 OR ?PORPHIN? OR CHLORIN OR HEMIN? OR ?PHTHALOCYAN?)
 L25 581 SEA L24 AND L19
 L26 455 SEA L25 AND (SUBSTRAT? OR SURFACE? OR BASE# OR
 SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR FOUNDATION
 ? OR PANE? OR DISK? OR DISC# OR WAFER? OR PLATE OR
 PLATES)
 L27 56 SEA L26 AND (MONOLAYER? OR MONO(W) LAYER? OR SELF(N)
 ASSEMBL?)
 L28 54 SEA L26 AND (HALOGENAT? OR IODIN? OR BROMIN? OR
 CHLORIN? OR FLUORIN?)
 L29 3 SEA L26 AND (DOPE# OR DOPING? OR DOPANT?) (6N) ((N OR
 P) (3N) TYPE)
 L30 62 SEA L26 AND (DOPE# OR DOPING? OR DOPANT?)
 L31 53 SEA L26 AND ((N OR P) (3N) TYPE)
 L32 14 SEA L30 AND L31
 L33 188 SEA (L27 OR L28 OR L29 OR L30 OR L31 OR L32)
 L34 189 SEA L33 OR L21 OR L23
 L35 49 SEA L34 AND (ALCOHOL? OR OH OR HYDROXY?)
 L36 2 SEA L35 AND (((SILICON OR SI) (N) (OXYGEN OR O)) (3N)
 BOND?)
 L37 3 SEA L26 AND (((SILICON OR SI) (N) (OXYGEN OR O)) (3N)
 BOND?)
 L39 9 SEA L23 OR L29 OR (L36 OR L37)
 L42 22 SEA L27 AND (L28 OR L30 OR L31 OR L35)
 L43 14 SEA L28 AND (L30 OR L31)
 L44 16 SEA L28 AND L35
 L45 35 SEA L39 OR L43 OR L44
 L46 52 SEA L45 OR L42
 L47 7 SEA L46 AND L12
 L49 20 SEA L17 NOT L47

=> dup rem 1112 147 149
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PROCESSING COMPLETED FOR L112

PROCESSING COMPLETED FOR L47

PROCESSING COMPLETED FOR L49

L114 31 DUP REM L112 L47 L49 (9 DUPLICATES REMOVED)
 ANSWERS '1-13' FROM FILE HCPLUS
 ANSWERS '14-17' FROM FILE COMPENDEX
 ANSWER '18' FROM FILE SOLIDSTATE
 ANSWERS '19-25' FROM FILE WPIX
 ANSWERS '26-29' FROM FILE INSPEC
 ANSWERS '30-31' FROM FILE DISSABS

=> d 1114 1-13 ibib abs ed hitstr hitind

L114 ANSWER 1 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 1
ACCESSION NUMBER: 2006:431864 HCPLUS Full-text

DOCUMENT NUMBER: 145:114214

TITLE: Stepwise Formation and Characterization of
Covalently Linked **Multiporphyrin**
-Imide Architectures on **Si(100)**

AUTHOR(S): Jiao, Jieying; Anariba, Franklin; Tiznado,
Hugo; Schmidt, Izabela; Lindsey, Jonathan
S.; Zaera, Francisco; Bocian, David
F.

CORPORATE SOURCE: Department of Chemistry, University of
California, Riverside, CA, 92521-0403, USA

SOURCE: Journal of the American Chemical Society
(2006), 128(21), 6965-6974

CODEN: JACSAT; ISSN: 0002-7863

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

OTHER SOURCE(S): CASREACT 145:114214

AB A major challenge in mol. electronics and related fields entails the fabrication of elaborate mol. architectures on electroactive **surfaces** to yield hybrid mol./**semiconductor** systems. A method has been developed for the stepwise synthesis of oligomers of **porphyrins** linked covalently via imide units. A triallyl-**porphyrin** bearing an amino group serves as the **base** unit on **Si(100)**, and the alternating use of a dianhydride (3,3',4,4'- biphenyltetracarboxylic dianhydride) and a **porphyrin** -diamine for reaction enables the rapid and simple buildup of oligomers composed of 2-5 **porphyrins**. The properties of these **porphyrin** "multad" films on **Si** (100) were interrogated using a variety of techniques. The charge densities of the redox-active **porphyrin** oligomers were determined via electrochem. methods. The stepwise growth was evaluated in detail via Fourier transform IR (FTIR) spectroscopy and by selected X-ray photoelectron spectroscopic (XPS) studies. The morphol. was probed via AFM methods. Finally, the thickness was evaluated by using a combination of ellipsometry and AFM height profiling, accompanied by selected XPS studies. Collectively, these studies demonstrate that high charge d., ultrathin, **multiporphyrin** films of relatively well-controlled thickness can be grown in a stepwise fashion using the imide-forming reaction. The increased charge densities afforded by the **porphyrin** multads may prove important for the fabrication of mol.-**based** information-storage devices. This bottom-

up process for construction of surface-tethered mol. architectures complements the top-down lithog. approach for construction of functional devices with nanoscale dimensions.

ED Entered STN: 10 May 2006

IT 7440-21-3, Silicon, processes
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (stepwise formation and characterization of covalently linked multiporphyrin-imide architectures on Si(100))

RN 7440-21-3 HCPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 76-3 (Electric Phenomena)
 Section cross-reference(s): 66, 72

ST silicon porphyrin imide deriv surface reaction

IT Redox reaction
 (electrochem.; stepwise formation and characterization of covalently linked multiporphyrin-imide architectures on Si(100))

IT Amino group
 Molecular electronic devices
 Semiconductor devices
 Surface reaction
 Surface structure
 Thickness
 Ultrathin films
 (stepwise formation and characterization of covalently linked multiporphyrin-imide architectures on Si(100))

IT 2420-87-3, 3,3',4,4'-Biphenyltetracarboxylic dianhydride
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (BPTC; stepwise formation and characterization of covalently linked multiporphyrin-imide architectures on Si(100))

IT 101-77-9, Methylenedianiline
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (MDA; stepwise formation and characterization of covalently linked multiporphyrin-imide architectures on Si(100))

IT 886231-04-5P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
 (P-a; stepwise formation and characterization of covalently linked multiporphyrin-imide architectures on Si(100))

IT 7440-22-4, Silver, uses
 RL: DEV (Device component use); USES (Uses)
 (electrode; stepwise formation and characterization of covalently linked multiporphyrin-imide architectures on Si(100))

IT 108-32-7, Propylene carbonate 3109-63-5, Tetrabutylammonium hexafluorophosphate 16919-18-9, Hexafluorophosphate
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
 (electrolyte; stepwise formation and characterization of covalently linked multiporphyrin-imide architectures on Si(100))

IT 7440-21-3, Silicon, processes
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical

process); PROC (Process)
 (stepwise formation and characterization of covalently linked
 multiporphyrin-imide architectures on Si
 (100))
 IT 886231-37-4P 896465-71-7P
 RL: PNU (Preparation, unclassified); RCT (Reactant); PREP
 (Preparation); RACT (Reactant or reagent)
 (stepwise formation and characterization of covalently linked
 multiporphyrin-imide architectures on Si
 (100))
 IT 886231-37-4D, reaction products with anhydride functional
porphyrins 896465-71-7D, reaction products with
 anhydride functional **porphyrins**
 RL: PRP (Properties)
 (stepwise formation and characterization of covalently linked
 multiporphyrin-imide architectures on Si
 (100))
 IT 101-77-9DP, reaction products with anhydride functional
porphyrins 886231-04-5DP, **silicon**
surface complexes, reaction products
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP
 (Preparation); RACT (Reactant or reagent)
 (stepwise formation and characterization of covalently linked
 multiporphyrin-imide architectures on Si
 (100))

REFERENCE COUNT: 46 THERE ARE 46 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L114 ANSWER 2 OF 31 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 2
 ACCESSION NUMBER: 2005:182320 HCAPLUS Full-text
 DOCUMENT NUMBER: 142:289339
 TITLE: High temperature attachment of organic
 molecules to substrates
 INVENTOR(S): Bocian, David F.; Lindsey,
 Jonathan; Liu, Zhiming;
 Yasseri, Amir A.; Misra, Veen; Zhao, Qian; Li,
 Qiliang; Surthi, Shyam; Loewe, Robert S.
 PATENT ASSIGNEE(S): The Regents of the University of California,
 USA
 SOURCE: U.S. Pat. Appl. Publ., 35 pp., Cont.-in-part
 of U.S. Ser. No. 628,868.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---------------|------|----------|-----------------|--------------|
| ----- | ---- | ----- | ----- | |
| US 2005048691 | A1 | 20050303 | US 2003-742596 | 2003 1219 |
| US 2005019500 | A1 | 20050127 | US 2003-628868 | 2003 0728 |
| US 6943054 | B2 | 20050913 | | |
| WO 2005043583 | A2 | 20050512 | WO 2004-US24105 | 2004 0726 |
| WO 2005043583 | A3 | 20051208 | | |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,
 CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG,
 ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP,
 KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
 MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL,

PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,
 TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
 RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
 ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH,
 CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU,
 MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI,
 CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

EP 1649526 A2 20060426 EP 2004-816786

2004
0726

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,
 MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,
 EE, HU, PL, SK, HR

PRIORITY APPLN. INFO.: US 2003-489992P P

2003
0725

US 2003-628868 A2
2003
0728

US 2003-742596 A
2003
1219

WO 2004-US24105 W
2004
0726

AB This invention provides a new procedure for attaching mols. to **semiconductor** surfaces, in particular **Si**. The mols., which include, but are not limited to **porphyrins** and **ferrocenes**, were previously shown to be attractive candidates for mol.-based information storage. The new attachment procedure is simple, can be completed in short times, requires minimal amts. of material, is compatible with diverse mol. functional groups, and in some instances affords unprecedented attachment motifs. These features greatly enhance the integration of the mol. materials into the processing steps that are needed to create hybrid mol./**semiconductor** information storage devices.

ED Entered STN: 04 Mar 2005

IT 7440-21-3, **Silicon**, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (high temperature attachment of organic mols. to substrates for information storage systems)

RN 7440-21-3 HCPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

IC ICM H01L051-40
 ICS H01L021-26; H01L021-477

INCL 438099000; 438795000

CC 76-3 (Electric Phenomena)

Section cross-reference(s): 48, 66

ST org mol attachment **semiconductor** substrate information storage

IT **Porphyrins**

RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)

(complexes; high temperature attachment of organic mols. to substrates for information storage systems)

IT Coating materials
 Coating process
 Diodes
 Etching
 Functional groups
 Gate contacts
 Heat treatment
 Hybrid organic-inorganic materials
 Integrated circuits
 Lithography
 Molecular beam epitaxy
 Molecules
 Rectifiers
 Redox reaction
 Semiconductor device fabrication
 Semiconductor devices
 Semiconductor materials
 Semiconductor materials
 Semiconductor memory devices
 Sputtering
 Transistors
 (high temperature attachment of organic mols. to substrates for
 information storage systems)

IT **Porphyrins**
 RL: CPS (Chemical process); NUU (Other use, unclassified); PEP
 (Physical, engineering or chemical process); PROC (Process); USES
 (Uses)
 (high temperature attachment of organic mols. to substrates for
 information storage systems)

IT **Porphyrins**
 RL: CPS (Chemical process); NUU (Other use, unclassified); PEP
 (Physical, engineering or chemical process); PROC (Process); USES
 (Uses)
 (polymers; high temperature attachment of organic mols. to substrates
 for information storage systems)

IT 1313-96-8, Niobium oxide (Nb₂O₅) 1314-35-8, Tungsten trioxide,
 processes 1314-61-0, Tantalum oxide (Ta₂O₅) 7440-03-1,
 Niobium, processes 7440-21-3, Silicon,
 processes 7440-25-7, Tantalum, processes 7440-33-7, Tungsten,
 processes 7440-56-4, Germanium, processes .
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical
 process); PYP (Physical process); TEM (Technical or engineered
 material use); PROC (Process); USES (Uses)
 (high temperature attachment of organic mols. to substrates for
 information storage systems)

L114 ANSWER 3 OF 31 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 3
 ACCESSION NUMBER: 2005:77999 HCAPLUS Full-text
 DOCUMENT NUMBER: 142:167539
 TITLE: Covalently attachment of organic molecules to
 group III, IV or V substrates as information
 storage device
 INVENTOR(S): Bocian, David F.; Lindsey,
 Jonathan S.; Liu, Zhiming;
 Yasseri, Amir A.; Loewe, Robert S.
 PATENT ASSIGNEE(S): The Regents of the University of California,
 USA
 SOURCE: U.S. Pat. Appl. Publ., 22 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------|------|-------|-----------------|-------|
| ----- | --- | ----- | ----- | ----- |
| ----- | --- | ----- | ----- | ----- |

10/0400059

| | | | | |
|------------------------|--|-----------------|-----------------|--------------|
| US 2005019500 | A1 | 20050127 | US 2003-628868 | |
| | | | | 2003 0728 |
| US 6943054 | B2 | 20050913 | | |
| US 2005048691 | A1 | 20050303 | US 2003-742596 | |
| | | | | 2003 1219 |
| WO 2005043583 | A2 | 20050512 | WO 2004-US24105 | |
| | | | | 2004 0726 |
| WO 2005043583 | A3 | 20051208 | | |
| W: | AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW | | | |
| RW: | BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | |
| EP 1649526 | A2 | 20060426 | EP 2004-816786 | |
| | | | | 2004 0726 |
| R: | AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, HR | | | |
| US 2005217559 | A1 | 20051006 | US 2005-140011 | |
| | | | | 2005 0526 |
| PRIORITY APPLN. INFO.: | | US 2003-489992P | P | |
| | | | | 2003 0725 |
| | | US 2003-628868 | A2 | |
| | | | | 2003 0728 |
| | | US 2003-742596 | A | |
| | | | | 2003 1219 |
| | | WO 2004-US24105 | W | |
| | | | | 2004 0726 |

AB A procedure for attaching mols. to **semiconductor** surfaces, in particular **silicon**, is simple, can be completed in short times, requires minimal amts. of material, is compatible with diverse mol. functional groups, and in some instances affords unprecedented attachment motifs. The mols., which include, but are not limited to **porphyrins** and **ferrocenes**, have been previously shown to be attractive candidates for mol.-based information storage. These features greatly enhance the integration of the mol. materials into the processing steps that are needed to create hybrid mol./**semiconductor** information storage devices. Such a method of covalently coupling an organic mol. to a surface of a Group III, IV, or V element or to a **semiconductor** comprising a Group III, IV, or V element, comprises the steps of: providing a heat resistant organic mol. derivatized with an attachment group; and contacting the derivatized heat resistant organic mol. with a surface of said Group III, IV, or V element or **semiconductor** comprising a Group III, IV, or V element; and heating the surface to a temperature of at least about 200° C. whereby said attachment group forms a covalent bond with said surface.

ED Entered STN: 28 Jan 2005

IT 7440-21-3D, **Silicon**, optionally doped

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(covalently attachment of organic mols. to group III, IV or V substrates as information storage device)

RN 7440-21-3 HCAPLUS
 CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

IC ICM B05D003-02
 ICS H01M004-60
 INCL 427384000; 429213000
 CC 76-3 (Electric Phenomena)
 ST **porphyrin silicon** information storage medium
 IT Diodes
 Electrochemical cells
 Integrated circuits
 Memory devices
 Rectifiers
 Semiconductor device fabrication
 Semiconductor materials
 Transistors
 (covalently attachment of organic mols. to group III, IV or V substrates as information storage device)
 IT **Porphyrins**
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
 (covalently attachment of organic mols. to group III, IV or V substrates as information storage device)
 IT 150152-74-2, 5-(4-Ethynylphenyl)-10,15,20-
 trimesitylporphinatozinc(II) 150676-43-0,
 5-[4-[2-(Trimethylsilyl)ethynyl]phenyl]-10,15,20-tri-p-
 tolylporphinatozinc(II) 184153-94-4,
 5-[4-[2-(Trimethylsilyl)ethynyl]phenyl]-10,15,20-
 trimesitylporphinatozinc(II) 210905-79-6,
 5,15-Bis(4-iodophenyl)-10,20-**dimesitylporphinatozinc(II)**
 211999-48-3, 5,10-Bis(4-ethynylphenyl)-15,20-
 dimesitylporphinatozinc(II) 211999-54-1,
 5,10-Bis(4-iodophenyl)-15,20-**dimesitylporphinatozinc(II)**
 211999-56-3, 5,10-Bis[4-[2-(trimethylsilyl)ethynyl]phenyl]-15,20-
 dimesitylporphinatozinc(II) 247069-46-1,
 5,15-Bis(4-ethynylphenyl)-10,20-**dimesitylporphinatozinc(II)**
 247103-29-3, 5-(4-Iodophenyl)-10,15,20-
 trimesitylporphinatozinc(II) 251989-85-2,
 5-[4-(S-Acetylthiomethyl)phenyl]-10,15,20-
 trimesitylporphinatozinc(II) 468095-54-7,
 5-(3,5-Diethynylphenyl)-10,15,20-**trimesitylporphinatozinc(II)**
 485370-19-2, 5-[4-(Hydroxymethyl)phenyl]-10,15,20-
 trimesitylporphinatozinc(II) 501011-89-8,
 5-(4-Bromophenyl)-10,15,20-tri-p-**tolylporphinatozinc(II)**
 502613-00-5, 5,10,15,20-Tetrakis(4-ethynylphenyl)
 porphinatozinc(II) 632301-78-1, 5,15-Bis(4-
 ethynylphenyl)-10,20-bis(4-tert-butylphenyl)**porphinatozinc(II)**
 632301-82-7, 5,15-Bis(4-ethynylphenyl)
 porphinatozinc(II) 651033-96-4, 5-(4-Bromomethylphenyl)-
 10,15,20-**trimesitylporphinatozinc(II)** 651033-97-5,
 5-[4-(Mercaptomethyl)phenyl]-10,15,20-
 trimesitylporphinatozinc(II) 651034-10-5,
 5-(4-Hydroxyphenyl)-10,15,20-**trimesitylporphinatozinc(II)**
 753459-98-2, 5-(4-Vinylphenyl)-10,15,20-
 trimesitylporphinatozinc(II) 753459-99-3,
 5-(4-Allylphenyl)-10,15,20-**trimesitylporphinatozinc(II)**
 753460-04-7, 5-(4-Vinylphenyl)-10,15,20-tri-p-
 tolylporphinatozinc(II) 753460-05-8,

5-(4-Allylphenyl)-10,15,20-tri-p-tolylporphinatozinc(II)
 753460-21-8 784151-82-2, 5-[4-(Hydroxymethyl)phenyl]-10,15,20-
 tri-p-tolylporphinatozinc(II) 820233-67-8,
 5-(Hydroxymethyl)-10,15,20-trimesitylporphinatozinc(II)
 827314-46-5, 5-(4-Formylphenyl)-15-phenyl-10,20-di-p-
 tolylporphinatozinc(II) 827314-57-8,
 5-[4-(4,4,5,5-Tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl]-10,20-
 bis(3,5-di-tert-butylphenyl)-15-mesitylporphinatozinc
 (II) 827314-59-0, 5-Iodo-10,20-bis(3,5-di-tert-butylphenyl)-15-
 mesitylporphinatozinc(II) 827314-64-7,
 5,10,15-Tris(4-ethynylphenyl)-20-mesitylporphinatozinc
 (II) 827314-68-1, 5,15-Bis(3-ethynylphenyl)-10,20-
 dimesitylporphinatozinc(II) 827314-73-8 827314-75-0,
 5-(4-Iodophenyl)-10,20-bis(3,5-di-tert-butylphenyl)-15-
 mesitylporphinatozinc(II) 827314-77-2,
 5,10-Bis(4-ethynylphenyl)-15,20-bis(4-tert-butylphenyl)
 porphinatozinc(II) 827314-79-4 827314-85-2
 827314-87-4, 5,10-Bis[4-[2-(triisopropylsilyl)ethynyl]biphen-4'-
 yl]-15,20-bis(4-tert-butylphenyl)porphinatozinc(II)
 827314-89-6, 5,10-Bis[4-[2-(triisopropylsilyl)ethynyl]phenyl]-
 15,20-bis(4-tert-butylphenyl)porphinatozinc(II)
 827322-27-0 827322-28-1

RL: DEV (Device component use); RCT (Reactant); TEM (Technical or
 engineered material use); RACT (Reactant or reagent); USES (Uses)
 (covalently attachment of organic mols. to group III, IV or V
 substrates as information storage device)

IT 102-54-5D, Ferrocene, derivative 7440-21-3D, Silicon
 , optionally doped 7440-56-4D, Germanium, optionally doped
 RL: DEV (Device component use); TEM (Technical or engineered
 material use); USES (Uses)
 (covalently attachment of organic mols. to group III, IV or V
 substrates as information storage device)

REFERENCE COUNT: 37 THERE ARE 37 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L114 ANSWER 4 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 4

ACCESSION NUMBER: 2004:580260 HCPLUS Full-text

DOCUMENT NUMBER: 141:270428

TITLE: Synthesis of **Porphyrins** Bearing
 Hydrocarbon Tethers and Facile Covalent
 Attachment to **Si**(100)

AUTHOR(S): **Liu, Zhiming; Yasseri, Amir A.; Loewe, Robert S.; Lysenko, Andrey B.; Malinovskii, Vladimir L.; Zhao, Qian; Surthi, Shyam; Li, Qiliang; Misra, Veena; Lindsey, Jonathan S.; Bocian, David F.**

CORPORATE SOURCE: Department of Chemistry, University of California, Riverside, CA, 92521-0403, USA

SOURCE: Journal of Organic Chemistry (2004), 69(17), 5568-5577

CODEN: JOCEAH; ISSN: 0022-3263

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

OTHER SOURCE(S): CASREACT 141:270428

AB The use of redox-active mols. as the active storage elements in memory chips requires the ability to attach the mols. to an electroactive surface in a reliable and robust manner. To explore the use of **porphyrins** tethered to **Si** via carbosilane linkages, 17 **porphyrins** were synthesized. Fourteen **porphyrins** bear a tether at a single meso site, and three **porphyrins** bear functional groups at two β sites for possible two-point attachment. Two high-temperature processing methods (400° under inert atmospheric) were developed for rapid (minutes), facile covalent attachment to **Si** platforms. The high-temperature processing conditions afford attachment either by direct deposition of a dilute solution (1 μ M-1 mM) of the **porphyrin** sample onto the **Si** substrate or

sublimation of a neat sample onto the Si substrate. The availability of this diverse collection of **porphyrins** enables an in-depth examination of the effects of the tether (length, composition, terminal functional group, number of tethers) and steric bulk of nonlinking substituents on the information-storage properties of the **porphyrin** monolayers obtained upon attachment to Si. Attachment proceeds readily with a wide variety of hydrocarbon tethers, including 2-(trimethylsilyl)ethynyl, vinyl, allyl, or 3-but enyl directly appended to the **porphyrin** and iodo, bromomethyl, 2-(trimethylsilyl)ethynyl, ethynyl, vinyl, or allyl appended to the 4-position of a meso-Ph ring. No attachment occurs with substituents such as Ph, p-tolyl, mesityl, or Et. Collectively, the studies show that the high-temperature attachment procedure (1) has broad scope encompassing diverse functional groups, (2) tolerates a variety of arene substituents, and (3) does not afford indiscriminate attachment. The high-temperature processing conditions are ideally suited for use in fabrication of hybrid mol./semiconductor circuitry.

ED Entered STN: 21 Jul 2004
 CC 78-7 (Inorganic Chemicals and Reactions)
 Section cross-reference(s): 26, 76
 ST **porphyrin** hydrocarbon tether prepn covalent attachment
 silicon wafer; zinc **porphyrin** hydrocarbon tether
 prepn covalent attachment silicon wafer
 IT **Semiconductor** devices
 (circuits; preparation of **porphyrins** containing hydrocarbon
 tethers for facile covalent attachment to Si(100) in
 fabrication of hybrid mol./semiconductor circuitry)
 IT **Porphyrins**
 RL: RCT (Reactant); SPN (Synthetic preparation); TEM (Technical or
 engineered material use); PREP (Preparation); RACT (Reactant or
 reagent); USES (Uses)
 (preparation of **porphyrins** containing hydrocarbon tethers for
 facile covalent attachment to Si(100) in fabrication
 of hybrid mol./semiconductor circuitry)
 IT Electric circuits
 (semiconductive; preparation of **porphyrins**
 containing hydrocarbon tethers for facile covalent attachment to
 Si(100) in fabrication of hybrid mol./
 semiconductor circuitry)
 IT **Metalloporphyrins**
 RL: RCT (Reactant); SPN (Synthetic preparation); TEM (Technical or
 engineered material use); PREP (Preparation); RACT (Reactant or
 reagent); USES (Uses)
 (zinc; preparation of **porphyrins** containing hydrocarbon
 tethers for facile covalent attachment to Si(100) in
 fabrication of hybrid mol./semiconductor circuitry)
 IT 150152-74-2DP, monolayer derivative on Si(100)
 184153-94-4DP, monolayer derivative on Si(100)
 247103-29-3DP, monolayer derivative on Si(100)
 485370-19-2DP, monolayer derivative on Si(100)
 651033-96-4DP, monolayer derivative on Si(100)
 753459-98-2DP, monolayer derivative on Si(100)
 753459-99-3DP, monolayer derivative on Si(100)
 753460-00-3DP, monolayer derivative on Si(100)
 753460-01-4DP, monolayer derivative on Si(100)
 753460-02-5DP, monolayer derivative on Si(100)
 753460-03-6DP, monolayer derivative on Si(100)
 753460-04-7DP, monolayer derivative on Si(100)
 753460-05-8DP, monolayer derivative on Si(100)
 753460-06-9DP, monolayer derivative on Si(100)
 753460-07-0DP, monolayer derivative on Si(100)
 753460-08-1DP, monolayer derivative on Si(100)
 753460-09-2DP, monolayer derivative on Si(100)
 753460-10-5DP, monolayer derivative on Si(100)
 753460-22-9DP, monolayer derivative on Si(100)
 RL: SPN (Synthetic preparation); TEM (Technical or engineered
 material use); PREP (Preparation); USES (Uses)
 (covalent attachment of **porphyrins** containing hydrocarbon
 tether to Si(100) in fabrication of hybrid mol./
 semiconductor circuitry)

IT 150152-74-2 184153-94-4 247103-29-3 485370-19-2
 651033-96-4
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (covalent attachment to Si(100) in fabrication of
 hybrid mol./semiconductor circuitry)

IT 109-97-7, Pyrrole 487-68-3, 2,4,6-Trimethylbenzaldehyde
 506-96-7, Acetyl bromide 638-02-8 874-60-2, 4-Methylbenzoyl
 chloride 2100-17-6, 4-Pentenal 10602-36-5 15164-44-0,
 4-Iodobenzaldehyde 16688-89-4, 2,4,6-Triethylbenzaldehyde
 21211-65-4 147804-55-5 159152-14-4 173322-53-7 186382-64-9
 266341-16-6 305830-98-2 307537-99-1
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (for preparation of **porphyrin** containing hydrocarbon tether)

IT 13399-65-0P 77785-94-5P 77814-87-0P 99405-03-5P
 682153-13-5P 682153-21-5P 753460-11-6P 753460-12-7P
 753460-13-8P 753460-14-9P 753460-15-0P 753460-16-1P
 753460-17-2P 753460-18-3P 753460-19-4P 753460-20-7P
 753460-23-0P 753460-26-3P 753460-27-4P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP
 (Preparation); RACT (Reactant or reagent)
 (for preparation of **porphyrin** containing hydrocarbon tether)

IT 753459-98-2P 753459-99-3P 753460-00-3P 753460-01-4P
 753460-02-5P 753460-03-6P 753460-04-7P 753460-05-8P
 753460-06-9P 753460-07-0P 753460-08-1P 753460-09-2P
 753460-10-5P 753460-22-9P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP
 (Preparation); RACT (Reactant or reagent)
 (preparation and covalent attachment to Si(100) in
 fabrication of hybrid mol./semiconductor circuitry)

IT 697301-60-3P 753460-24-1P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP
 (Preparation); RACT (Reactant or reagent)
 (preparation and failed covalent attachment to Si(100))

IT 132371-60-9
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (preparation of **porphyrins** containing hydrocarbon tethers for
 facile covalent attachment to Si(100) in fabrication
 of hybrid mol./semiconductor circuitry)

IT 753460-21-8P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP
 (Preparation); RACT (Reactant or reagent)
 (preparation, vinylation, and failed covalent attachment to
 Si(100))

REFERENCE COUNT: 68 THERE ARE 68 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L114 ANSWER 5 OF 31 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 6
 ACCESSION NUMBER: 2003:472878 HCAPLUS Full-text
 DOCUMENT NUMBER: 139:45187
 TITLE: Method and system for molecular charge-storage
 field-effect transistor
 INVENTOR(S): Misra, Veena; Bocian, David F.;
 Kuhr, Werner G.; Lindsey, Jonathan S.
 PATENT ASSIGNEE(S): The Regents of the University of California,
 USA
 SOURCE: U.S. Pat. Appl. Publ., 24 pp.
 CODEN: USXXCO
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|------------|------|-------|-----------------|-------|
| ----- | ---- | ----- | ----- | ----- |
| ----- | ---- | ----- | ----- | ----- |

10/0400059

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|------------------------|--|-----------------|-----------------|------|
| US 2003111670 | A1 | 20030619 | US 2001-17999 | |
| | | | | 2001 |
| | | | | 1214 |
| US 6674121 | B2 | 20040106 | | |
| WO 2003052835 | A1 | 20030626 | WO 2002-US39981 | |
| | | | | 2002 |
| | | | | 1212 |
| W: | AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW | | | |
| RW: | GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | |
| AU 2002357223 | A1 | 20030630 | AU 2002-357223 | |
| | | | | 2002 |
| | | | | 1212 |
| EP 1474832 | A1 | 20041110 | EP 2002-805137 | |
| | | | | 2002 |
| | | | | 1212 |
| R: | AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK | | | |
| JP 2005513786 | T | 20050512 | JP 2003-553633 | |
| | | | | 2002 |
| | | | | 1212 |
| US 2005062097 | A1 | 20050324 | US 2004-498743 | |
| | | | | 2004 |
| | | | | 1101 |
| PRIORITY APPLN. INFO.: | | | US 2001-17999 | A2 |
| | | | | 2001 |
| | | | | 1214 |
| | | WO 2002-US39981 | | W |
| | | | | 2002 |
| | | | | 1212 |

AB Method and system for mol.-based FET (m-FET) using charge-storage mols. between gate and channel of an FET are described. The charge-storage FET comprises: a substrate comprising a channel region; a source and a drain in elec. contact with said channel region, such that current can flow between said source and said drain through said channel region and affected by the conductance of the said channel region; ≥ 1 of charge-storage mols. proximate to said channel region, wherein charge stored on said mols. affects the conductance of said channel region; and a gate proximate to said ≥ 1 of charge-storage mols. such that a voltage between said gate and said source or said drain will change the charge stored on said charge-storage mols.

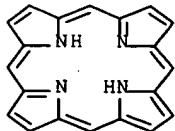
ED Entered STN: 20 Jun 2003

IT 101-60-0D, Porphyrin, derivs.

RL: DEV (Device component use); NUU (Other use, unclassified); PRP (Properties); USES (Uses)
(mols.; method and system for mol. charge-storage field-effect transistor)

RN 101-60-0 HCPLUS

CN 21H,23H-Porphine (9CI) (CA INDEX NAME)



IT 7440-21-3, Silicon, uses
 RL: DEV (Device component use); USES (Uses)
 (substrate; method and system for mol. charge-storage
 field-effect transistor)
 RN 7440-21-3 HCPLUS
 CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

IC ICM H01L031-0328
 INCL 257200000
 CC 76-3 (Electric Phenomena)
 IT Metallocenes
 Polyenes
Porphyrins
 RL: DEV (Device component use); NUU (Other use, unclassified); PRP
 (Properties); USES (Uses)
 (mols.; method and system for mol. charge-storage field-effect
 transistor)
 IT Semiconductor materials
 (substrate; method and system for mol. charge-storage
 field-effect transistor)
 IT 101-60-0D, Porphyrin, derivs. 31366-25-3D,
 Tetrathiafulvalene, derivs. 54489-01-9D, Tetraselenafulvalene,
 derivs.
 RL: DEV (Device component use); NUU (Other use, unclassified); PRP
 (Properties); USES (Uses)
 (mols.; method and system for mol. charge-storage field-effect
 transistor)
 IT 7440-21-3, Silicon, uses
 RL: DEV (Device component use); USES (Uses)
 (substrate; method and system for mol. charge-storage
 field-effect transistor)

REFERENCE COUNT: 33 THERE ARE 33 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L114 ANSWER 6 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 7
 ACCESSION NUMBER: 2003:920518 HCPLUS Full-text
 DOCUMENT NUMBER: 140:120306
 TITLE: Molecular Memories That Survive
 Silicon Device Processing and
 Real-World Operation
 AUTHOR(S): Liu, Zhiming; Yasseri, Amir A.;
 Lindsey, Jonathan S.; Bocian,
 David F.
 CORPORATE SOURCE: Department of Chemistry, University of
 California, Riverside, CA, 92521-0403, USA
 SOURCE: Science (Washington, DC, United States)
 (2003), 302(5650), 1543-1545
 CODEN: SCIEAS; ISSN: 0036-8075
 PUBLISHER: American Association for the Advancement of
 Science

DOCUMENT TYPE: Journal; General Review
 LANGUAGE: English
 AB A review. If mol. components are to be used as functional elements in place of the semiconductor-based devices present in conventional microcircuitry, they must compete with semiconductors under the extreme conditions required for processing and operating a practical device. Herein, porphyrin-based mols. bound to Si(100), which exhibit redox behavior useful for information storage, can meet this challenge. These mol. media in an inert atmospheric are stable under extremes of temperature (400°) for extended periods (approaching 1 h) and do not degrade under large nos. of read-write cycles. (1012).

ED Entered STN: 25 Nov 2003
 IT 7440-21-3, Silicon, uses
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
 (porphyrin based silicon
 semiconductor device for mol. memories applications)
 RN 7440-21-3 HCAPLUS
 CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 76-0 (Electric Phenomena)
 ST review silicon bonded porphyrin
 semiconductor device application
 IT Redox reaction
 Semiconductor devices
 Semiconductor memory devices
 (porphyrin based silicon
 semiconductor device for mol. memories applications)
 IT Porphyrins
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
 (porphyrin based silicon
 semiconductor device for mol. memories applications)
 IT 7440-21-3, Silicon, uses
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
 (porphyrin based silicon
 semiconductor device for mol. memories applications)
 REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L114 ANSWER 7 OF 31 HCAPLUS COPYRIGHT 2007 ACS on STN DUPLICATE 8
 ACCESSION NUMBER: 2002:928462 HCAPLUS Full-text
 DOCUMENT NUMBER: 138:97251
 TITLE: Measurements of Electron-Transfer Rates of Charge-Storage Molecular Monolayers on Si(100). Toward Hybrid Molecular/Semiconductor Information Storage Devices
 AUTHOR(S): Roth, Kristian M.; Yasseri, Amir A.; Liu, Zhiming; Dabke, Rajeev B.; Malinovskii, Vladimir; Schweikart, Karl-Heinz; Yu, Lianhe; Tiznado, Hugo; Zaera, Francisco; Lindsey, Jonathan S.; Kuhr, Werner G.; Bocian, David F.
 CORPORATE SOURCE: Department of Chemistry, University of California, Riverside, CA, 92521-0403, USA
 SOURCE: Journal of the American Chemical Society (2003), 125(2), 505-517
 CODEN: JACSAT; ISSN: 0002-7863

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Redox kinetics were measured for 2 electroactive mols. attached to Si(100) surfaces, a ferrocene (Fc-BzOH) and a Zn(II) **trimesitylporphyrin** (Por-BzOH). Each mol. was derivatized with a benzyl alc. linker for attachment to the Si surface via the formation of a Si-O bond. A complete protocol was developed for the preparation of stable Si(100) surfaces derivatized with the electroactive mols. The redox-kinetic measurements were performed on the resulting Fc-BzOH and Por-BzOH monolayers to probe (1) the rate of electron transfer (k_0) for oxidation in the presence of applied potentials and (2) the rate of charge dissipation after the applied potential is disconnected (as a charge-retention half-life $t_{1/2}$). The k_0 values for the 2 types of monolayers are similar to one another as were the $t_{1/2}$ values. Perhaps more importantly, the electron-transfer rates for both the Fc-BzOH and the Por-BzOH monolayers differ from the charge-dissipation rates by .apprx.6 orders of magnitude and are strongly dependent on the surface concentration of the electroactive species. For the Por-BzOH monolayers on Si (100), the k_0 and $t_{1/2}$ values and their trends as a function of surface coverage are similar to those previously measured for the analogous thiol-derivatized mol. assembled on Au(111). But the Fc-BzOH monolayers on Si(100) exhibit much slower electron-transfer and charge-dissipation rates than those in the corresponding thiol-Au(111) case. Two alternative hypotheses are advanced to explain both the diminution in rates with increased surface coverage and the contrasting behavior with the analogous thiols on Au, one based on space-charge effects at the monolayer-solution interface, and a 2nd relying on changes in distance of the redox centers from the surface as modulated by the orientation of the linking chains. Collectively, the ability to prepare and study stable, electroactive mol. media on Si(100) probably is key in the development of hybrid mol./semiconductor devices.

ED Entered STN: 08 Dec 2002

IT 7440-21-3, Silicon, uses

RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)

(measurements of electron-transfer rates of charge-storage mol. monolayers on Si(100) toward hybrid mol./semiconductor information storage devices)

RN 7440-21-3 HCPLUS

CN Silicon (7CI, 8CI, 9CI) (CA INDEX NAME)

Si

CC 72-2 (Electrochemistry)

Section cross-reference(s): 29, 66, 67, 76, 78

ST electron transfer kinetics charge storage mol monolayer silicon; hybrid mol semiconductor information storage device; ferrocenylbenzyl alc attachment silicon electrochem redox reaction kinetics; hydroxymethylphenylferrocene prepn attachment silicon electrochem redox reaction kinetics; zinc hydroxymethylphenyltrimesitylporphyrin prepn attachment silicon electrochem redox reaction kinetics

IT Chemically modified electrodes

Microelectrodes

((hydroxymethyl)phenylferrocene and zinc
[(hydroxymethyl)phenyl]trimesitylporphyrin monolayers attached to Si surface through Si -O bond)

IT Binding energy

X-ray photoelectron spectra

((hydroxymethyl)phenylferrocene and zinc
[(hydroxymethyl)phenyl]trimesitylporphyrin monolayers on Si)

IT Oxidation kinetics
 Redox reaction
 Redox reaction kinetics
 (electrochem.; of (hydroxymethyl)phenylferrocene and zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 on p-type Si(100) microelectrodes in propylene
 carbonate containing Bu4NPF6)

IT Electric charge
 Monolayers
 Semiconductor devices
 (measurements of electron-transfer rates of charge-storage mol.
 monolayers on Si(100) toward hybrid mol./
 semiconductor information storage devices)

IT Electron transfer kinetics
 (of (hydroxymethyl)phenylferrocene and zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 attached to Si surface through Si
 -O bond)

IT Cyclic voltammetry
 Oxidation, electrochemical
 (of (hydroxymethyl)phenylferrocene and zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 on p-type Si(100) microelectrodes in propylene
 carbonate containing Bu4NPF6)

IT 1333-74-0, Hydrogen, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (Si passivated with hydrogen and
 reaction of hydride-passivated Si with
 iodine in fabrication of monolayers of
 (hydroxymethyl)phenylferrocene or Zn [(hydroxymethyl)phenyl]
 trimesitylporphyrin on silicon
 microelectrode)

IT 3109-63-5, Tetrabutylammonium hexafluorophosphate
 RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
 (cyclic voltammetry of (hydroxymethyl)phenylferrocene and zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 on p-type Si(100) microelectrodes in propylene
 carbonate containing Bu4NPF6)

IT 485370-30-7, 4-(Hydroxymethyl)phenylferrocenium
 RL: FMU (Formation, unclassified); PRP (Properties); FORM
 (Formation, nonpreparative)
 (electrochem. oxidative formation in cyclic voltammetry of
 (hydroxymethyl)phenylferrocene monolayers on p-type Si
 (100) microelectrodes in propylene carbonate containing Bu4NPF6)

IT 485370-27-2
 RL: FMU (Formation, unclassified); PRP (Properties); FORM
 (Formation, nonpreparative)
 (electrochem. oxidative formation in cyclic voltammetry of zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 on p-type Si(100) microelectrodes in propylene
 carbonate containing Bu4NPF6)

IT 485370-25-0
 RL: FMU (Formation, unclassified); PRP (Properties); RCT
 (Reactant); FORM (Formation, nonpreparative); RACT (Reactant or
 reagent)
 (electrochem. oxidative formation in cyclic voltammetry of zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 on p-type Si(100) microelectrodes in propylene
 carbonate containing Bu4NPF6)

IT 12155-54-3D, reaction products with iodine-modified
 silicon 485370-19-2D, reaction products with
 iodine-modified silicon
 RL: CPS (Chemical process); DEV (Device component use); PEP
 (Physical, engineering or chemical process); PRP (Properties);
 PROC (Process); USES (Uses)
 (in monolayer preparation on microelectrodes and determination of
 electron-transfer rates of charge-storage mol. monolayers on

Si(100) in relation to hybrid mol./
semiconductor information storage)

IT 7440-21-3, Silicon, uses
 RL: CPS (Chemical process); DEV (Device component use); PEP
 (Physical, engineering or chemical process); PRP (Properties); RCT
 (Reactant); PROC (Process); RACT (Reactant or reagent); USES
 (Uses)
 (measurements of electron-transfer rates of charge-storage mol.
 monolayers on Si(100) toward hybrid mol./
 semiconductor information storage devices)

IT 12155-54-3P, 4-(Hydroxymethyl)phenylferrocene 485370-19-2P
 RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation);
 PREP (Preparation); RACT (Reactant or reagent)
 (preparation and attachment to Si with Si-
 O bond formation and determination of
 electron-transfer rates of charge-storage mol. monolayers on
 Si(100) in relation to hybrid mol./
 semiconductor information storage devices)

IT 7553-56-2, Iodine, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (reaction with hydride-passivated Si in modification
 of Si with ferrocenylbenzyl alc. or zinc
 hydroxymethylphenyltrimesitylporphyrin)

REFERENCE COUNT: 92 THERE ARE 92 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L114 ANSWER 8 OF 31 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2006:858545 HCAPLUS Full-text
 TITLE: Infrared spectroscopy of Si
 (100)/molecule/metal interfaces
 AUTHOR(S): Bocian, David F.; Anariba, Franklin
 CORPORATE SOURCE: Department of Chemistry, University of
 California, Riverside, Riverside, CA, 92521,
 USA
 SOURCE: Abstracts of Papers, 232nd ACS National
 Meeting, San Francisco, CA, United States,
 Sept. 10-14, 2006 (2006), COLL-260. American
 Chemical Society: Washington, D. C.
 CODEN: 69IHRD
 DOCUMENT TYPE: Conference; Meeting Abstract; (computer
 optical disk)

LANGUAGE: English

AB The promise of incorporating mols. into microelectronic devices has stimulated a variety of approaches to making metal/mol./metal and **semiconductor**/mol./metal junctions for applications ranging from mol. diodes to memory devices. However, the fate of mols. upon top-metal deposition is generally not well characterized. Towards this goal, **silicon** surfaces were modified with monolayers of **porphyrins** that were covalently attached via carbosilane linkages using a high temperature (400 °C under inert atmospheric) baking method. Subsequently, thin films (3 - 8 nm thick) of silver, gold, and copper were deposited onto the mols. by electron-beam evaporation at low pressures. Attenuated total reflectance Fourier-transform IR spectroscopy (ATR-FTIR) was employed to interrogate the tethered **porphyrins** in the buried interface, and thereby assess their integrity upon top-metal deposition, and to examine metal - organic functional group interaction.

ED Entered STN: 25 Aug 2006

L114 ANSWER 9 OF 31 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2006:858536 HCAPLUS Full-text
 TITLE: Fabrication and characterization of
 multiporphyrin-imide on Si
 (100) for molecular-based
 information-storage devices
 AUTHOR(S): Jiao, Jieying; Anariba, Franklin; Tiznado,
 Hugo; Schmidt, Izabela; Lindsey, Jonathan
 S.; Zaera, Francisco; Bocian, David
 F.

10/0400059

CORPORATE SOURCE: Department of Chemistry, University of California, Riverside, Riverside, CA, 92521-0403, USA
SOURCE: Abstracts of Papers, 232nd ACS National Meeting, San Francisco, CA, United States, Sept. 10-14, 2006 (2006), COLL-250. American Chemical Society: Washington, D. C.
DOCUMENT TYPE: Conference; Meeting Abstract; (computer optical disk)
LANGUAGE: English
AB A major challenge in mol. electronics and related fields entails the fabrication of elaborate mol. architectures on electroactive surfaces to yield hybrid mol.-semiconductor systems. A method has been developed for the stepwise synthesis of oligomers of porphyrins linked covalently via imide units. A triallyl-porphyrin bearing an amino group serves as the base unit on Si(100). The alternating use of a dianhydride and a porphyrin-diamine for reaction enables the rapid and simple buildup of oligomers composed of 2-5 porphyrins. The charge densities of the porphyrin oligomers were determined via electrochem. methods and the stepwise growth of porphyrin was evaluated in detail via FTIR and XPS studies. The thickness is also evaluated by using a combination of ellipsometry, AFM height profiling and XPS. These studies indicated that high charge d., ultra-thin multiporphyrin films with relative well-controlled thickness can be grown in a stepwise fashion using the imide-forming reaction.
ED Entered STN: 25 Aug 2006

L114 ANSWER 10 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2004:223805 HCPLUS Full-text
TITLE: Fabrication and electrochemical characterization of porphyrin-based molecular memory devices
AUTHOR(S): Wei, Lingyun; Liu, Zhiming; Yasseri, Amir A.; Lindsey, Jonathan S.; Bocian, David F.
CORPORATE SOURCE: Department of Chemistry, University of California, Riverside, Riverside, CA, 92521, USA
SOURCE: Abstracts of Papers, 227th ACS National Meeting, Anaheim, CA, United States, March 28-April 1, 2004 (2004), COLL-202. American Chemical Society: Washington, D. C.
DOCUMENT TYPE: Conference; Meeting Abstract
LANGUAGE: English
AB The integration of mol. components with semiconductor platforms provides the basis for hybrid mol. semiconductor electronic devices. Towards this goal, we have examined the characteristics of various redox-active porphyrin monolayers attached to patterned Si (100) surfaces via a Si-C bond. The formation of monolayers on Si was confirmed by fast scan cyclic voltammetry. The electrochem. properties were investigated for both liquid and gel electrolytes. Gel electrolytes afford the advantage of solid-state packaging, which is necessary for real devices. Electrochem. impedance spectroscopy was used to measure the conductivity of gel electrolytes. The electron-transfer rates and charge retention characteristics of the memory cell were examined by swept waveform AC voltammetry and open circuit potential amperometry, resp.
ED Entered STN: 21 Mar 2004

L114 ANSWER 11 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2003:356737 HCPLUS Full-text
DOCUMENT NUMBER: 138:347493
TITLE: Formation of self-assembled monolayers on silicon substrates
INVENTOR(S): Bocian, David F.; Kuhr, Werner G.; Lindsey, Jonathan S.; Dabke, Rajeeve Balkrishna; Liu, Zhiming
PATENT ASSIGNEE(S): The Regents of the University of California, USA

SOURCE: PCT Int. Appl., 69 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|--|----------|-----------------|--------------|
| ----- | ----- | ----- | ----- | ----- |
| WO 2003038886 | A1 | 20030508 | WO 2002-US33045 | 2002 1014 |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW | RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GO, GW, ML, MR, NE, SN, TD, TG | | | |

PRIORITY APPLN. INFO.: US 2001-40059 A
 2001
 1026

AB This invention provides a new method of forming a self-assembling monolayer (SAM) of alc.-terminated or thiol-terminated organic mols. (e.g. ferrocenes, **porphyrins**, etc.) on a **silicon** or other group IV element surface. The assembly is based on the formation of an E-O- or an E-S- bond where E is the group IV element (e.g. Si, Ge, etc). The procedure has been successfully used on both p- and n-type group IV element surfaces. The assemblies are stable under ambient conditions and can be exposed to repeated electrochem. cycling.

ED Entered STN: 09 May 2003

IC ICM H01L021-3205

ICS H01L021-4763

CC 76-3 (Electric Phenomena)

ST Self assembled monolayer formation **silicon** substrate

IT Self-assembled monolayers

Semiconductor device fabrication

(formation of self-assembled monolayers on **silicon** substrates)

IT **Porphyrins**

RL: DEV (Device component use); USES (Uses)

(method of forming self-assembling monolayer of alc.-terminated or thiol-terminated organic mols.)

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L114 ANSWER 12 OF 31 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:599474 HCAPLUS Full-text

DOCUMENT NUMBER: 137:344418

TITLE: Capacitance and conductance characterization of ferrocene-containing self-assembled monolayers on silicon surfaces for memory applications

AUTHOR(S): Li, Qiliang; Mathur, Guru; Homsi, Mais;
 Surthi, Shyam; Misra, Veena; Malinovskii,
 Vladimir; Schweikart, Karl-Heinz; Yu, Lianhe;
 Lindsey, Jonathan S.; Liu,
 Zhiming; Dabke, Rajeev B.;
 Yasseri, Amir; Bocian, David F.;
 Kuhr, Werner G.

10/0400059

CORPORATE SOURCE: Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC, 27695, USA
SOURCE: Applied Physics Letters (2002), 81(8), 1494-1496
CODEN: APPLAB; ISSN: 0003-6951
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Self-assembled monolayers of 4-ferrocenylbenzyl alc. attached to Si provided the basis for electrolyte-mol.-Si capacitors. Characterization by conventional capacitance and conductance techniques showed very high capacitance and conductance peaks near .apprx.0.6 V associated with charging and discharging of electrons into and from discrete levels in the monolayer owing to the presence of the redox-active ferrocenes. The reversible charge trapping of these mols. suggest their potential application in memory devices. Due to the mol. scalability and low-power operation, mol.-Si hybrid devices may be strong candidates for next-generation electronic devices.
ED Entered STN: 12 Aug 2002
CC 76-3 (Electric Phenomena)
Section cross-reference(s): 78
REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L114 ANSWER 13 OF 31 HCAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2001:199538 HCAPLUS Full-text
TITLE: Porphyrin based molecular memory: Development of "solid state" device
AUTHOR(S): Dabke, Rajeev; Yasseri, Amir A.; Liu, Zhiming; Kuhr, Werner G.; Bocian, David F.; Lindsey, Johnathan S.
CORPORATE SOURCE: Department of Chemistry, University of California-Riverside, Riverside, CA, 92521, USA
SOURCE: Abstracts of Papers, 221st ACS National Meeting, San Diego, CA, United States, April 1-5, 2001 (2001) COLL-284
CODEN: 69FZD4
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal; Meeting Abstract
LANGUAGE: English
AB Development of a mol. memory device based on redox process requires a robust, reversible and electrochem. stable system. Towards this end, we have demonstrated that porphyrin and phthalocyanine derivs. self-assembled on gold meets these conditions (1,2). A practical device requires solid-state assembly and packaging. Herein, we describe the investigation of a number of gel-based "solid state" electrolyte systems. These systems are found to exhibit similar performance characteristics to those previously observed for traditional electrochem. solvent/electrolyte systems.
ED Entered STN: 22 Mar 2001

=> d 1114 14-17,26-31 ibib ed

L114 ANSWER 14 OF 31 COMPENDEX COPYRIGHT 2007 EEI on STN DUPLICATE
5
ACCESSION NUMBER: 2004(10):2684 COMPENDEX Full-text
TITLE: Multibit memory using **self-assembly** of mixed ferrocene/porphyrin monolayers on silicon.
AUTHOR: Li, Qiliang (Department of Elec. and Comp. Eng. North Carolina State University, Raleigh, NC 27695, United States); Mathur, Guru; Gowda, Srivardhan; Surthi, Shyam; Zhao, Qian; Yu, Lianhe; Lindsey, Jonathan S.; Bocian, David F.; Misrai, Veena

SOURCE: Advanced Materials v 16 n 2 Jan 16 2004 2004.p
133-137

SOURCE: Advanced Materials v 16 n 2 Jan 16 2004 2004.p
133-137

CODEN: ADVMEW ISSN: 0935-9648

PUBLICATION YEAR: 2004

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

L114 ANSWER 15 OF 31 COMPENDEX COPYRIGHT 2007 EEI on STN
ACCESSION NUMBER: 2004(18):10865 COMPENDEX Full-text
TITLE: Integration of molecular components into
silicon memory devices.

AUTHOR: Kuhr, Werner G. (Chemistry Faculty
University of California, Riverside, CA,
United States)

SOURCE: Electrochemical Society Interface v 13 n 1
Spring 2004 2004.p 34-38

SOURCE: Electrochemical Society Interface v 13 n 1
Spring 2004 2004.p 34-38

CODEN: ELSIE3 ISSN: 1064-8208

PUBLICATION YEAR: 2004

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical

LANGUAGE: English

L114 ANSWER 16 OF 31 COMPENDEX COPYRIGHT 2007 EEI on STN
ACCESSION NUMBER: 2001(45):3755 COMPENDEX Full-text
TITLE: Capacitance voltage characteristics of
polysilicon - Polysilicon oxide - Polysilicon
structures for three-dimensional memory.

AUTHOR: Lindsey, J.R. (Microelectronics Res.
Laboratories Dept. of Electrical and Comp.
Eng. University of Colorado, Colorado Springs,
CO 80933-7150, United States); Kalkur, T.S.

MEETING TITLE: Amorphous and Heterogeneous Silicon Thin
Films-2000.

MEETING LOCATION: San Francisco, CA, United States

MEETING DATE: 24 Apr 2000-28 Apr 2000

SOURCE: Materials Research Society Symposium -
Proceedings v 609 2000.p A2921-A2926

SOURCE: Materials Research Society Symposium -
Proceedings v 609 2000.p A2921-A2926

CODEN: MRSPDH ISSN: 0272-9172

PUBLICATION YEAR: 2000

MEETING NUMBER: 58627

DOCUMENT TYPE: Conference Article

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

L114 ANSWER 17 OF 31 COMPENDEX COPYRIGHT 2007 EEI on STN
ACCESSION NUMBER: 2001(1):4903 COMPENDEX Full-text
TITLE: Molecular approach toward information storage
based on the redox properties of
porphyrins in self-assembled
monolayers.

AUTHOR: Roth, Kristian M. (Univ of California,
Riverside, CA, USA); Dontha, Narasaiah;
Dabke, Rajeev B.; Gryko, Daniel T.;
Clausen, Christian; Lindsey, Jonathan
S.; Bocian, David F.;
Kuhr, Werner G.

SOURCE: Journal of Vacuum Science and Technology B:
Microelectronics and Nanometer Structures v 18
n 5 Sep 2000. p 2359-2364, American Inst of
Physics, Woodbury, NY, USA

SOURCE: Journal of Vacuum Science and Technology B:
 Microelectronics and Nanometer Structures v 18
 n 5 Sep 2000. p 2359-2364, American Inst of
 Physics, Woodbury, NY, USA
 CODEN: JVTBD9 ISSN: 0734-211X

PUBLICATION YEAR: 2000

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

L114 ANSWER 26 OF 31 INSPEC (C) 2007 IET on STN

ACCESSION NUMBER: 2003:7672169 INSPEC Full-text

DOCUMENT NUMBER: B2003-08-2550N-020

TITLE: Electrical characterization of redox-active
 molecular monolayers on SiO₂ for memory
 applications

AUTHOR: Qiliang Li; Surthi, S.; Mathur, G.; Gowda, S.;
 Misra, V.; (Dept. of Electr. & Comput. Eng.,
 North Carolina State Univ., Raleigh, NC, USA),
 Sorenson, T.A.; Tenent, R.C.; Kuhr,
 W.G.; Tamari, S.; Lindsey, J.S.
 ; Zhiming Liu; Bocian, D.F.

SOURCE: Applied Physics Letters (7 July 2003), vol.83,
 no.1, p. 198-200, 12 refs.

CODEN: APPLAB, ISSN: 0003-6951

SICI: 0003-6951(20030707)83:1L.198:ECRA;1-8

Price: 01/03/6951/2003/83(1)/198(3) /\$20.00

Doc.No.: S0003-6951(03)05924-2

Published by: AIP, USA

DOCUMENT TYPE: Journal

TREATMENT CODE: Practical; Experimental

COUNTRY: United States

LANGUAGE: English

ED 20050421

L114 ANSWER 27 OF 31 INSPEC (C) 2007 IET on STN

ACCESSION NUMBER: 2004:7862307 INSPEC Full-text

DOCUMENT NUMBER: B2004-03-1265D-099; C2004-03-5320Z-004

TITLE: Hybrid silicon/molecular memories:
 co-engineering for novel functionality

AUTHOR: Gowda, S.; Mathur, G.; Qihang Li; Surthi, S.;
 Qian Zhao; (Dept. of Electr. & Comput. Eng.,
 North Carolina State Univ., Raleigh, NC, USA),
 Lindsey, J.S.; Mobley, K.;
 Bocian, D.F.; Misra, V.

SOURCE: IEEE International Electron Devices Meeting
 2003, 2003, p. 22.1.1-4 of 999 pp., 10 refs.

ISBN: 0 7803 7872 5

Price: 0-7803-7872-5/03/\$17.00

Published by: IEEE, Pisacataway, NJ, USA

Conference: IEEE International Electron
 Devices Meeting 2003, Washington, DC, USA,
 8-10 Dec. 2003

DOCUMENT TYPE: Conference; Conference Article

TREATMENT CODE: Practical; Experimental

COUNTRY: United States

LANGUAGE: English

ED 20050422

L114 ANSWER 28 OF 31 INSPEC (C) 2007 IET on STN

ACCESSION NUMBER: 2002:7481410 INSPEC Full-text

DOCUMENT NUMBER: B2003-01-1265D-039

TITLE: Polysilicon thin film transistor and EEPROM
 characteristics for three dimensional memory

AUTHOR: Lindsey, J.R.; Kalkur, T.S. (Dept.
 of Electr. & Comput. Eng., Colorado Univ.,
 Colorado Springs, CO, USA)

SOURCE: Thin Film Transistor Technologies V.
 Proceedings of the International Symposium
 (Electrochemical Society Proceedings
 Vol.2000-31), 2001, p. 312-19 of xi+340 pp., 6
 refs.
 Editor(s): Kuo, Y.
 ISBN: 1 56677 298 2
 Published by: Electrochem. Soc, Pennington,
 NJ, USA
 Conference: Thin Film Transistor Technologies
 V. Proceedings of the International Symposium,
 Phoenix, AZ, USA, 23-25 Oct. 2000
 Conference; Conference Article
 DOCUMENT TYPE:
 TREATMENT CODE: Experimental
 COUNTRY: United States
 LANGUAGE: English
 ED 20050421

L114 ANSWER 29 OF 31 INSPEC (C) 2007 IET on STN
 ACCESSION NUMBER: 2002:7174387 INSPEC Full-text
 DOCUMENT NUMBER: B2002-03-2130-006
 TITLE: Capacitance voltage characteristics of
 polysilicon-polysilicon oxide-polysilicon
 structures for three-dimensional memory
 AUTHOR: Lindsey, J.R.; Kalkur, T.S. (Dept.
 of Electr. & Comput. Eng., Colorado Univ.,
 Colorado Springs, CO, USA)
 SOURCE: Amorphous and Heterogeneous Silicon Thin Films
 - 2000. Symposium (Materials Research Society
 Symposium Proceedings Vol.609), 2001, p.
 A29.2.1-6 of xxv+1082 pp., 10 refs.
 Editor(s): Collins, R.W.; Branz, H.M.;
 Stutzmann, M.; Guha, S.; Okamoto, H.
 ISBN: 1 55899 517 X
 Published by: Mater. Res. Soc, Warrendale, PA,
 USA
 Conference: Amorphous and Heterogeneous
 Silicon Thin Films - 2000. Symposium, San
 Francisco, CA, USA, 24-28 April 2000
 Conference; Conference Article
 DOCUMENT TYPE:
 TREATMENT CODE: Practical; Theoretical; Experimental
 COUNTRY: United States
 LANGUAGE: English
 ED 20050420

L114 ANSWER 30 OF 31 DISSABS COPYRIGHT (C) 2007 ProQuest Information
 and Learning Company; All Rights Reserved on STN
 ACCESSION NUMBER: 2006:62066 DISSABS Order Number: AAI3210427
 TITLE: Characterization of the **porphyrinic**
 architectures for use in molecular information
 storage applications
 AUTHOR: Wei, Lingyun [Ph.D.]; Bocian, David F.
 [advisor]
 CORPORATE SOURCE: University of California, Riverside (0032)
 SOURCE: Dissertation Abstracts International, (2006) Vol.
 67, No. 3B, p. 1418. Order No.: AAI3210427. 199
 pages.
 ISBN: 978-0-542-59981-1.
 DOCUMENT TYPE: Dissertation
 FILE SEGMENT: DAI
 LANGUAGE: English
 ENTRY DATE: Entered STN: 20061127
 Last Updated on STN: 20061127
 ED Entered STN: 20061127
 Last Updated on STN: 20061127

L114 ANSWER 31 OF 31 DISSABS COPYRIGHT (C) 2007 ProQuest Information

10/0400059

and Learning Company; All Rights Reserved on STN
ACCESSION NUMBER: 2005:30565 DISSABS Order Number: AAI3151732
TITLE: Characterization of redox-active monolayers for use
in molecular memory devices. Part I: Self-assembled
molecular monolayers on gold. Part II: Covalently
linked molecular monolayers on
semiconductors
AUTHOR: Yasseri, Amir Ali [Ph.D.]; Kuhr, Werner G.
[advisor]; Bocian, David F. [advisor]
CORPORATE SOURCE: University of California, Riverside (0032)
SOURCE: Dissertation Abstracts International, (2004) Vol.
65, No. 10B, p. 5124. Order No.: AAI3151732. 282
pages.
ISBN: 0-496-11938-9.
DOCUMENT TYPE: Dissertation
FILE SEGMENT: DAI
LANGUAGE: English
ENTRY DATE: Entered STN: 20050628
Last Updated on STN: 20050628
ED Entered STN: 20050628
Last Updated on STN: 20050628

=> d 1114 19-25 ibib ed hit ind

L114 ANSWER 19 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2006-299042 [31] WPIX
CROSS REFERENCE: 2003-644858
DOC. NO. CPI: C2006-113238 [36]
DOC. NO. NON-CPI: N2006-291956 [36]
TITLE: Nanoscale electrochemical cell useful in
electrochemical molecular memory device comprises
well having specific cross-sectional area and its
wall having two electrodes separated by
non-conductor or **semi-conductor**
DERWENT CLASS: E12; L03; U11; U14
INVENTOR: BOCIAN D F; KUHR W G; LIU Z;
YASSERI A
PATENT ASSIGNEE: (REGC-C) UNIV CALIFORNIA
COUNTRY COUNT: 1

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| US 20060081950 | A1 | 20060420 | (200631)* | EN | 21[6] | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|-----------|----------------|----------|
| US 20060081950 | A1 Div Ex | US 2001-46499 | 20011026 |
| US 20060081950 | A1 | US 2005-112359 | 20050422 |

PRIORITY APPLN. INFO: US 2005-112359 20050422
US 2001-46499 20011026

ED 20060518

TI Nanoscale electrochemical cell useful in electrochemical molecular
memory device comprises well having specific cross-sectional area
and its wall having two electrodes separated by non-conductor or
semi-conductor

IN BOCIAN D F; KUHR W G; LIU Z; YASSERI A

NOV NOVELTY - A nanoscale electrochemical cell (C1) comprises a well
having a cross-sectional area of less than 1 microns². A wall of
the well comprises a first electrode and a second electrode
separated by a non-conductor or **semi-conductor**
. The first and second electrodes are exposed to the interior of

the well. The ratio of the surface area of the first electrode to the surface area of the second electrode is at least 2:1.

DETD DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

- (1) an electrochemical cell array (A1) comprising several (C1);
- (2) a sensor comprising (A1); and
- (3) formation (M1) of (C1) involves depositing the first conductor on a non-conducting substrate; depositing a **semiconductor** or a nonconductor on the conductor; depositing the second conductor on the **semiconductor** or nonconductor; and forming a hole through the second conductor, the nonconductor or **semiconductor** and the first conductor. The hole forms a well having a cross-sectional area less than 1 microns². The first conductor, insulator or **semiconductor**, and second conductor comprise a wall of the well.

TECH

ELECTRONICS - Preferred Device: The ratio is at least 5:1, and is predetermined. The well has a volume less than 1x10⁻¹⁴ L (preferably less than 10 femtoliters (10x10⁻¹⁵ L)). The well is in fluid communication with a microchannel. The wells are formed on a **silicon** substrate. The first and second electrode comprises all the walls comprising the well except the bottom wall and if present a top wall. The first electrode is a **semiconductor**. The **semiconductor** is an insulator. The second electrode has electrically coupled to a redox active molecule or a binding partner (preferably binding partner). The redox active molecule is attached to the second electrode via a linker (preferably linker bearing a sulfur or alcohol). The array comprises at least 10 (preferably at least 100) wells. The center to center distance between two wells is less than or equal to 2.5 microns (preferably less than or equal to 250 nm). The several cells comprising (A1) are independently addressable. The array is formed on a **silicon** substrate.

The sensor comprises at least two (at least ten) different binding partners, each species of binding partner in a different well.

Preferred Method: The first and second conductor is deposited by a method selected from electron beam evaporation, thermal evaporation, electrochemical reduction or electroless deposition. The depositing the first and second conductor involves depositing a layer of conducting material and selectively removing regions of the conducting material to form a patterned conducting material. The selective removing involving placing a patterned resist on the conductor and then etching the conductor. The first conductor comprises a silver layer, and the second conductor comprises a chromium gold layer. The nonconductor or **semiconductor** comprises a dielectric. The hole is formed by a method selected from laser drilling, reactive ion etching (RIE), chemically assisted ion beam milling (CAIBM) or etching. (M1) further involving coupling the redox active molecule or the binding partner to the second conductor. The hole is one of several holes.

INORGANIC CHEMISTRY - Preferred component: The insulator and the non-conducting substrate selected from **silicon** dioxide or **silicon** nitride.

ORGANIC CHEMISTRY - Preferred component: The redox-active molecule is a molecule selected from a **porphyrinic** macrocycle, metallocene, linear polyene, cyclic polyene, heteroatom-substituted linear polyene, heteroatom-substituted cyclic polyene, tetrathiafulvalene, tetraselenafulvalene, metal coordination complex, buckyball, triarylamine, 1,4-phenylenediamine, xanthene, flavin, phenazine, phenothiazine, acridine, quinoline, 2,2' - bipyridyl, 4,4'-bipyridyl, tetrathiotetracene or peri-bridged naphthalene dichalcogenide (preferably **porphyrin**, expanded **porphyrin**, contracted **porphyrin**, ferrocene, linear **porphyrin** polymer, **porphyrinic** sandwich complex, **porphyrin** array, **porphyrinic** macrocycle substituted at a beta-position or at a meso-position).

The binding partner is selected from a nucleic acid, protein, antibody, lectin, carbohydrate or glycoprotein. METALLARGY - Preferred component: The first and second electrodes/conductor selected from copper, silver, chromium, gold, platinum, conducting polymer, aluminum, silicon, germanium, gallium arsenide, ruthenium, titanium or tantalum. The first electrode comprises silver electrode, and the second electrode comprises gold electrode.

AN 2006-299042 [31] WPIX

DC E12; L03; U11; U14

IPCI H01L0027-14 [I,A]; H01L0029-66 [I,C]; H01L0029-66 [I,C]; H01L0029-82 [I,A]; H01L0029-84 [I,A]

L114 ANSWER 20 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2006-778377 [79] WPIX

DOC. NO. CPI: C2006-241074 [79]

DOC. NO. NON-CPI: N2006-601317 [79]

TITLE: New **porphyrin** compound, useful for attachment to electroactive surfaces via carbon tethers for use in **semiconductor** industry

DERWENT CLASS: E13; E23; L03; P31; U11

INVENTOR: **LINDSEY J S**; LOEWE R S

PATENT ASSIGNEE: (LIND-I) LINDSEY J S; (LOEW-I) LOEWE R S;
(UYNC-N) UNIV NORTH CAROLINA STATE

COUNTRY COUNT: 109

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| US 20060009638 | A1 | 20060112 | (200679)* | EN | 23[1] | |
| WO 2006016943 | A1 | 20060216 | (200679) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|-----------------|----------|
| US 20060009638 | A1 | US 2004-886816 | 20040708 |
| WO 2006016943 | A1 | WO 2005-US18858 | 20050527 |

PRIORITY APPLN. INFO: US 2004-886816 20040708

ED 20061208

TI New **porphyrin** compound, useful for attachment to electroactive surfaces via carbon tethers for use in **semiconductor** industry

TT TT: NEW PORPHYRIN COMPOUND USEFUL ATTACH SURFACE CARBON SEMICONDUCTOR INDUSTRIAL

IN **LINDSEY J S**; LOEWE R S

NOV NOVELTY - A **porphyrin** compound is new.

DETD DETAILED DESCRIPTION - A **porphyrin** compound is new and has a surface attachment group coupled at the 5 position, the surface attachment group having the formula $-((Ar)_m-(CH_2)_n)p-R$.

R=-CHCH₂ or -CCH;

Ar=aromatic group;

m=0-4;

n=0-6;

p=greater than or equal to 1.

INDEPENDENT CLAIMS are also included for:

- (1) a method of making a **porphyrin** compound having a surface attachment group coupled at the 5 position;
- (2) a method of making a dipyrromethane compound having a surface attachment group coupled at the 5 position, comprising reacting a precursor compound of formula X-((Ar)_m-(CH₂)_n)p-R with a pyrrole to produce the dipyrromethane compound having the surface attachment group substituted at the 5 position; and
- (3) a method of making a 1,9-diacyldipyrromethane metal

complex, comprising acylating a dipyrromethane compound having a surface attachment group coupled at the 5 position to form a mixed reaction product comprising a 1,9-diacyldipyrromethane, combining the mixed reaction product with a compound of formula R'2MX'2 in the presence of a base, and separating the metal complex from the mixed reaction product.

X=aldehyde or acetal group;
R'=alkyl or aryl;
M=Sn, Si, Ge, or Pb;
X'=halo, OAc, acac or Otf.

USE

USE - For attachment to electroactive surfaces via carbon tethers for use in **semiconductor** industry.

TECH

ORGANIC CHEMISTRY - Preparation (claimed): The **porphyrin** compound is prepared by reacting a dipyrromethane with a dipyrromethane-1,9-dicarbinol to produce a reaction product, and then oxidizing the reaction product to produce the **porphyrin** compound.

AN 2006-778377 [79] WPIX

DC E13; E23; L03; P31; U11

IC ICM A61B005-055

ICS A61B010-00; A61K031-40; A61K031-555; C07B047-00; C07F005-00

IPCI C07D0403-00 [I,C]; C07D0403-02 [I,A]; C07D0487-00 [I,C];

C07D0487-22 [I,A]

MC CPI: E05-E01B; E05-F; E06-D18; L04-A04D

EPI: U11-A09

CMC UPB 20061208

L114 ANSWER 21 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2006-115499 [12] WPIX

CROSS REFERENCE: 2005-131097; 2005-221542

DOC. NO. CPI: C2006-040936 [12]

DOC. NO. NON-CPI: N2006-099924 [12]

TITLE: Covalently coupling organic molecule, i.e.
redox-active molecule to **surface** of
Group III, IV, or V element, e.g. **silicon**
or to **semiconductor** involves providing
heat resistant organic molecule derivatized with
attachment group

DERWENT CLASS: A26; A85; E19; L03; U11; U12; U14

INVENTOR: BOCIAN D F; LINDSEY J S; LIU

Z; LOEWE R S; YASSERI A A

PATENT ASSIGNEE: (REGC-C) UNIV CALIFORNIA; (UYNC-N) UNIV NORTH
CAROLINA STATE

COUNTRY COUNT: 1

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| US 20050217559 | A1 | 20051006 | (200612)* | EN | 22[5] | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|----------------|-----------------|----------|
| US 20050217559 | A1 Provisional | US 2003-489992P | 20030725 |
| US 20050217559 | A1 Div Ex | US 2003-628868 | 20030728 |
| US 20050217559 | A1 | US 2005-140011 | 20050526 |

PRIORITY APPLN. INFO: US 2005-140011 20050526
US 2003-489992P 20030725
US 2003-628868 20030728

ED 20060217

TI Covalently coupling organic molecule, i.e. redox-active molecule
to **surface** of Group III, IV, or V element, e.g.

silicon or to **semiconductor** involves providing heat resistant organic molecule derivatized with attachment group

TT **TT: COVALENT COUPLE ORGANIC MOLECULAR REDOX ACTIVE SURFACE**

GROUP IV ELEMENT SILICON

SEMICONDUCTOR HEAT RESISTANCE ATTACH

IN **BOCIAN D F; LINDSEY J S; LIU Z; LOEWE R S;**
YASSERI A A

NOV NOVELTY - Organic molecule is covalently bonded to a surface of a Group III, IV, or V element or to a **semiconductor** comprising a Group III, IV, or V element by providing a heat resistant organic molecule derivatized with an attachment group.

DETD DETAILED DESCRIPTION - Covalently coupling an organic molecule to a surface of a Group III, IV, or V element or to a **semiconductor** comprising a Group III, IV, or V element involves providing a heat resistant organic molecule derivatized with an attachment group; contacting the derivatized heat resistant organic molecule with a surface of the Group III, IV, or V element or **semiconductor** comprising a Group III, IV, or V element; and heating the surface to greater than or equal to 200degreesC where the attachment group forms a covalent bond with the surface. INDEPENDENT CLAIMS are also included for:

- (a) a redox-active substrate comprising a Group III, IV or V element having attached to a redox-active molecule covalently attached to the surface of the Group III, IV, or V element through an attachment group; and covalent attachment is not by a silane and
- (b) a kit for coupling an organic molecule to the surface of a type III, IV, or V material comprising container containing a heat resistant organic molecule derivatized with an attachment group.

USE USE - For covalently coupling an organic molecule, i.e. redox-active molecule, e.g. **porphyrin**, **porphyrinic macrocycle**, an expanded **porphyrin**, a contracted **porphyrin**, linear **porphyrin** polymer, a **porphyrinic sandwich coordination complex** or **porphyrin array** to a surface of a Group (III)-(V) elements, e.g. silicon, germanium, doped silicon or doped germanium (claimed) or to a **semiconductor** comprising a Group III-(V) elements.

ADV ADVANTAGE - The method is completed in short times, requires minimal amounts of material, is compatible with diverse molecular functional groups and affords unprecedented attachment motifs, thus enhances the integration of the molecular materials into the processing steps that are needed to create hybrid molecular/**semiconductor** information storage devices.

TECH ELECTRONICS - Preferred Method: The surface is heated to greater than or equal to 300, preferably greater than or equal to 400degreesC. The method of claim 11, where the surface is hydrogen **passivated surface**. The organic molecule is applied to certain regions of the surface and not to other regions. A protective coating is placed on the surface in regions where the organic molecule is not to be attached.

ORGANIC CHEMISTRY - Preferred Component: The organic molecule comprises a **porphyrinic macrocycle** substituted at beta-position or at a meso-position. It also comprises a **porphyrinic macrocycle** containing at least two **porphyrins** of equal energies held apart from each other at a spacing less than 50Angstrom such that the molecule has an even or an odd hole oxidation where the hole hops between the two **porphyrins**, and where the odd hole oxidation state is different from and distinguishable from another oxidation state of the **porphyrinic macrocycle**. The attachment group is

4-(hydroxymethyl)phenyl, 4-(S-acetylthiomethyl)phenyl,
 4-(Se-acetylselenomethyl)phenyl, 4-(mercaptomethyl)phenyl,
 4-(hydrosele-nomethyl)phenyl, 4-formylphenyl, 4-(bromomethyl)phenyl, 4-vinylphenyl, 4-ethynylphenyl,
 4-allylphenyl, 4-(2-(trimethylsilyl)ethynyl)phenyl,
 4-(2-(triisopropylsilyl)ethynyl) phenyl, 4-bromophenyl,
 4-iodophenyl, 4-hydroxyphenyl, 4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl bromo, iodo, hydroxymethyl,
 S-acetylthiomethyl, Se-acetylselenomethyl, mercaptomethyl,
 hydroselonemethyl, formyl, bromomethyl, chloromethyl, ethynyl,
 vinyl, allyl, 4-(2-(4-(hydroxymethyl)phenyl)ethynyl)phenyl,
 4-(ethynyl)biphen-4'-yl, 4-(2-(triisopropylsilyl)ethynyl)biphen-4'-yl, 3,5-diethynylphenyl, or 2-bromoethyl. Organic molecules derivatized with 38 attachment group, e.g. 5-(4-(S-acetylthiomethyl)phenyl)-10,15, 20-trimesitylporphinatozinc(II), 5-(4-(mercaptomethyl)phenyl)- 10,15,20-trimesitylporphinatozinc(II), 5-(4-(hydroxymethyl)phenyl)-10,15,20-trimesitylporphinatozinc(II), 5-(4-(hydroxymethyl)phenyl)10,15,20-tri-p-tolylporphinatozinc(II), 5-(4-allylphenyl)-10, 15,20-trimesitylporphinatozinc(II), 5-(4-formylphenyl)-15-phenyl-10,20-di-p-tolylporphinatozinc(II), 5-(4-bromomethylphenyl)-10,15,20-trimesitylporphinatozinc(II), 5-(4-ethynylphenyl)-10,15,20trimesitylporphinatozinc(II), 5-(4-iodophenyl)-10,15,20trimesitylporphinatozinc(II) or 5-(4-bromophenyl)-10,15,20tri-p-tolylporphinatozinc(II).

AN 2006-115499 [12] WPIX

DC A26; A85; E19; L03; U11; U12; U14

IC ICM C30B001-00

L114 ANSWER 22 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2005-202415 [21] WPIX

DOC. NO. CPI: C2005-064704 [21]

DOC. NO. NON-CPI: N2005-166480 [21]

TITLE: Patterning of electrolyte on surface of information storage device comprises contacting surface with compound comprising redox active moiety, and subsequently, contacting surface with specific electrolyte

DERWENT CLASS: A85; E19; L03; T01; U11

INVENTOR: BOCIAN D F; KUHR W G;

LINDSEY J S; MISRA V

PATENT ASSIGNEE: (BOCI-I) BOCIAN D F; (KUHR-I) KUHR W G; (LIND-I) LINDSEY J S; (MISR-I) MISRA V; (REGC-C) UNIV CALIFORNIA; (UYNC-N) UNIV NORTH CAROLINA STATE

COUNTRY COUNT: 106

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|--------|----------|
| <hr/> | | | | | | |
| WO 2005017953 | A2 | 20050224 | (200521)* | EN | 71{13} | |
| US 20050207208 | A1 | 20050922 | (200563) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|----------------|-----------------|----------|
| <hr/> | | | |
| WO 2005017953 | A2 | WO 2004-US15615 | 20040518 |
| US 20050207208 | A1 Provisional | US 2003-473782P | 20030527 |
| US 20050207208 | A1 | US 2004-837028 | 20040430 |

PRIORITY APPLN. INFO: US 2003-473782P 20030527
 US 2004-837028 20040430

ED 20050708

IN BOCIAN D F; KUHR W G; LINDSEY J S;
 MISRA V

TECH

ORGANIC CHEMISTRY - Preferred Property: The surface attachment group reacts on contacting with the surface, is heat activated, photo activated or activated by electromagnetic radiation.

Preferred Process: The charged moiety is contacted with a reagent of formula: Z2-L3-KY.

K = group having charge complementary to the charge of J;

L3 = covalent bond or linker;

Z2 = surface attachment group, preferably (un) protected reactive site or group chosen from carboxylic acid, alcohol, thiol, selenol, tellurol, phosphonic acid, phosphonothioate, amine and nitrile;

-L3-Z2 = group chosen from 32 phenyl groups such as 4-carboxyphenyl, 2(4-carboxyphenyl) ethynyl, 4-(2-(4-carboxyphenyl)ethynyl)phenyl and 4-hydroxy(mercapto)phosphoryl phenyl; and

Y = counter ion.

K electrostatically associates with J to provide a counter ion group associated with information storage molecule. The counter ion is altered by an ion exchange process. A counter electrode is constructed by binding an electrode comprising conductive material or **semiconductive** material to the surface attachment group.

Preferred Reagent: The reagent is 11-mercaptop undecanoic acid, 16-mercaptop hexadecanoic acid, 3-mercaptop-1-propanoic acid, (2-mercaptop ethyl)trimethyl ammonium bromide or 4-(mercaptop methyl)benzene sulfonic acid.

Preferred Substrate: Alternately, the electro active substrate contains zone (A) having surface with an attached redox-active moiety of formula: J-L2-M-L1-Z1-S or Z2-L3-K---J-L2-M-L1-Z1-S.

J,L1-L 3,M,Z1,Z2,S,K = same as defined above.

The electro active substrate contains zone (B) having surface with an attached redox-active moiety different than M.

ELECTRONICS - Preferred Process: The method of storing data further involves detecting the oxidation state of the storage medium (102), refreshing the oxidation state of the medium, and reading out the data stored. The detecting process involves analyzing a read out signal in the time domain or frequency domain, or performing Fourier transform on the read out signal. The process further involves exposing the medium to an electric field to produce electric field oscillation having characteristic frequency and detecting the frequency. The detecting is performed by volumetric method or impedance spectroscopy. The voltage applied for storing data is up to 2V, or output of integrated circuit or logic gate.

ABEX DEFINITIONS - Preferred Definitions: - M = exists in 8 different oxidation states, porphyrinic macrocycle, porphyrin, sandwich coordination compound of porphyrinic macrocycle, metallocene, linear or cyclic polyene optionally substituted with hetero atom, tetra thia fulvalene, tetraselena fulvalene, metal coordinated complex, triaryl amine, 1,4-phenylene diamine, xanthene, flavin, phenazine, pheno thiazine, acridine, quinoline, 2,2'-bipyridyl, 4,4'-bipyridyl, tetrathio tetracene or peri-bridged naphthalene dichalcogenide; - Q = acyl hydrazide, amine, dipyrrin, acetylacetone, phenol, alcohol, diol, thiol, azide, phenanthrolene, zirconium dichloride, alkyl halide, aldehyde or zirconium hydroxide; - Z1, Z2 = optionally protected carboxylic acid, alcohol, thiol, selenol, tellurol, phosphonic acid, phosphonothioate, amine or nitrile; - L1, L2 = covalent bond, linker, 1,4-phenylene, 4,4'-diphenyl ethylene, 4,4'-diphenyl butadiyne, 4,4'-biphenyl, 4,4'-stilbene, 1,4-bicyclo octane, 4,4'-azobenzene, 4,4'-benzylidene aniline or 4,4''-terphenyl; - R = carboxaldehyde, ketone (e.g. acetylacetone), o-hydroxy carboxaldehyde, dipyrrin or amine; and - When R is carboxaldehyde, o-hydroxy carboxaldehyde or ketone, Q is acyl hydrazide or amine. When R is dipyrrin, Q is also dipyrrin..

EXAMPLE - Free base dipyrrin bearing benzyl alcohol unit was reacted at high concentration and high temperature to attach on

semiconductor surface. Copper acetate and triple decker sandwich coordination compound containing free base dipyrin were added to obtain bis(dipyrinato)copper II complex. Reagent containing phenol and acid hydrazide was added and phenol was reacted with phenol isocyanate compound having protected phosphonate unit. The phosphonate was deprotected and a counter electrode was deposited. The excess incoming reactants and reagents were washed. The copper II complex was resilient and did not undergo decomposition.

AN 2005-202415 [21] WPIX
DC A85; E19; L03; T01; U11

L114 ANSWER 23 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2003-332855 [31] WPIX
 CROSS REFERENCE: 2002-315248; 2002-361749; 2003-512072;
 2003-863373; 2004-592616
 DOC. NO. CPI: C2003-086279 [31]
 DOC. NO. NON-CPI: N2003-266808 [31]
 TITLE: Light harvesting rod composition for light
 harvesting array for solar cell used in
 electrical devices, includes oligomer
 DERWENT CLASS: E12; E13; L03; U12
 INVENTOR: LINDSEY J S; LOEWE R S
 PATENT ASSIGNEE: (UNNC-N) UNIV NORTH CAROLINA STATE; (LIND-I)
 LINDSEY J S; (LOEW-I) LOEWE R S
 COUNTRY COUNT: 99

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-----|----------|
| WO 2003019621 | A2 | 20030306 | (200331)* | EN | 105 | [3] |
| US 20030111108 | A1 | 20030619 | (200341) | EN | | |
| US 6603070 | B2 | 20030805 | (200353) | EN | | |
| AU 2002327519 | A1 | 20030310 | (200452) | EN | | |
| AU 2002327519 | A8 | 20051110 | (200634) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-------------------|--------|-----------------|----------|
| WO 2003019621 A2 | | WO 2002-US26948 | 20020823 |
| US 20030111108 A1 | CIP of | US 2000-621797 | 20000721 |
| US 6603070 B2 | CIP of | US 2000-621797 | 20000721 |
| US 20030111108 A1 | CIP of | US 2000-670463 | 20000926 |
| US 6603070 B2 | CIP of | US 2000-670463 | 20000926 |
| US 20030111108 A1 | CIP of | US 2001-852560 | 20010510 |
| US 6603070 B2 | CIP of | US 2001-852560 | 20010510 |
| US 20030111108 A1 | | US 2001-939010 | 20010824 |
| US 6603070 B2 | | US 2001-939010 | 20010824 |
| AU 2002327519 A1 | | AU 2002-327519 | 20020823 |
| AU 2002327519 A8 | | AU 2002-327519 | 20020823 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO | | |
|----------------|------|-----------|---------------|---|
| US 20030111108 | A1 | CIP of | US 6420648 | B |
| US 6603070 | B2 | CIP of | US 6420648 | B |
| AU 2002327519 | A1 | Based on | WO 2003019621 | A |
| AU 2002327519 | A8 | Based on | WO 2003019621 | A |

PRIORITY APPLN. INFO: US 2001-939010 20010824
 US 2000-621797 20000721
 US 2000-670463 20000926
 US 2001-852560 20010510

ED 20050528

IN LINDSEY J S; LOEWE R S

DETD DETAILED DESCRIPTION - A light harvesting rod composition comprises an oligomer of formula A1.(Ab+1)b (I).

INDEPENDENT CLAIMS are included for:

(1) a light harvesting array comprising a first substrate containing a first electrode, and a layer of light harvesting rods electrically coupled to the first electrode;

(2) a solar cell comprising the inventive light harvesting array, a second substrate comprising a second electrode, and an electrolyte in the space between the substrates; an electrical device comprising the solar cell, and a circuit electrically coupled to the solar cell;

(3) a method of making a light harvesting rod composition comprising coupling rod segments of formulae E(X1(Xm+1)m)1F and G(X1(Xm+1)m)2H.

b = at least 1;

A1 through Ab+1 = covalently coupled rod different segments having less positive electrochemical potentials; or a compound of formula X1(Xm+1)m;

m = at least 1;

X1 through Xm+1 = covalently coupled porphyrinic macrocycles;

E = end group;

Either F or G = ethynyl group; and

the other F or G is halo; H = end group.

ADV ADVANTAGE - The invention has intense absorption in the visible region, a narrow distribution of energies of the excited state, and an excited single-state lifetime sufficient for energy transfer. It does not require high temperature annealing steps to reduce internal resistances and does not have any losses associated with transporting charge through thick semiconductor films.

ABEX DEFINITIONS - Preferred Definitions: - X1 through Xm+1 = chlorins, bacteriochlorins, or isobacteriochlorins; - b = 1-5, preferably 1-2; - m = -20, preferably 1-5; - X1 through Xm+1 = beta-linked porphyrinic macrocycles; - F = trimethylsilyl-protected ethynylphenyl; - G = halo or iodo; - E = bromo or protected ethynyl.

EXAMPLE - A solution of porphyrin (506 mg) in trichloromethane (140 ml) was treated with zinc acetate (613 mg) overnight at room temperature. Standard workup and sonication with methanol afforded a purple solid (515 mg, 95%).

AN 2003-332855 [31] WPIX

DC E12; E13; L03; U12

L114 ANSWER 24 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2003-644858 [61] WPIX

CROSS REFERENCE: 2006-299042

DOC. NO. CPI: C2003-176239 [61]

DOC. NO. NON-CPI: N2003-512973 [61]

TITLE: Electrochemical cell array used for, e.g. molecular memory, includes nanoscale electrochemical cells including first and second electrodes separated by non-conductor or semi-conductor

DERWENT CLASS: L03; U14; X16

INVENTOR: BOCIAN D F; KUHR W G; LIU Z;

YASSERI A

PATENT ASSIGNEE: (REGC-C) UNIV CALIFORNIA

COUNTRY COUNT: 100

PATENT INFO ABBR.:

| PATENT NO | KIND DATE | WEEK | LA | PG | MAIN IPC |
|-----------|-----------|------|----|----|----------|
|-----------|-----------|------|----|----|----------|

| | | | | | |
|----------------|----|----------|-----------|----|-------|
| US 20030082444 | A1 | 20030501 | (200361)* | EN | 25[6] |
| WO 2003085752 | A2 | 20031016 | (200378) | EN | |
| AU 2002367718 | A1 | 20031020 | (200436) | EN | |
| EP 1449218 | A2 | 20040825 | (200456) | EN | |
| JP 2005520348 | W | 20050707 | (200545) | JA | 40 |
| AU 2002367718 | A8 | 20051020 | (200615) | EN | |
| US 7074519 | B2 | 20060711 | (200646) | EN | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|-----------------|----------|
| US 20030082444 | A1 | US 2001-46499 | 20011026 |
| AU 2002367718 | A1 | AU 2002-367718 | 20021007 |
| AU 2002367718 | A8 | AU 2002-367718 | 20021007 |
| EP 1449218 | A2 | EP 2002-807197 | 20021007 |
| WO 2003085752 | A2 | WO 2002-US32035 | 20021007 |
| EP 1449218 | A2 | WO 2002-US32035 | 20021007 |
| JP 2005520348 | W | WO 2002-US32035 | 20021007 |
| JP 2005520348 | W | JP 2003-582835 | 20021007 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO | |
|---------------|------|-----------|-----------------|
| AU 2002367718 | A1 | Based on | WO 2003085752 A |
| EP 1449218 | A2 | Based on | WO 2003085752 A |
| JP 2005520348 | W | Based on | WO 2003085752 A |
| AU 2002367718 | A8 | Based on | WO 2003085752 A |

PRIORITY APPLN. INFO: US 2001-46499 20011026

ED 20050531

TI Electrochemical cell array used for, e.g. molecular memory, includes nanoscale electrochemical cells including first and second electrodes separated by non-conductor or **semi-conductor**

IN BOCIAN D F; KUHR W G; LIU Z; YASSERI A

NOV NOVELTY - An electrochemical cell array comprises nanoscale electrochemical cells, where a cell comprising the array is a well having a cross-sectional area of less than 1 micron. A wall of the well comprises a first electrode (14) and a second electrode (16). The first and second electrodes are separated by a non-conductor or **semiconductor**.

DETD DETAILED DESCRIPTION - An electrochemical cell array comprises nanoscale electrochemical cells, where a cell comprising the array is a well having a cross-sectional area of less than 1 micron. A wall of the well comprises a first electrode and a second electrode. The first and second electrodes are separated by a non-conductor or **semi-conductor**. The ratio of the surface area of the first electrode exposed to the interior of the well to the surface area of the second electrode exposed to the interior of the well is at least 2:1.

An INDEPENDENT CLAIM is also included for a method of making a nanoscale electrochemical cell comprising:

- (i) depositing a first conductor on a non-conducting substrate;
- (ii) depositing a **semiconductor** or a non-conductor;
- (iii) depositing a second conductor; and
- (iv) forming a hole through the second conductor, the non-conductor, and the first conductor, where the hole forms a well having a cross-sectional area of less than 1 **um**.

TECH

ELECTRICAL POWER AND ENERGY - Preferred Component: The array comprises at least 10 wells, preferably at least 100 wells. The first electrode comprises all the walls comprising the well. The first electrode is a **semiconductor** which is an insulator. The second electrode is electrically coupled to a redox

10/0400059

active molecule via a linker bearing a sulfur or alcohol.

Preferred Concentration: The ratio is at least 5:1.

Preferred Property: The well has a volume of less than 1 x10power-14 L.

Preferred Dimension: The center to center distance between two wells comprising the array is at most 2.5 mum, preferably at most 250 nm.

INORGANIC CHEMISTRY - Preferred Material: The first electrode comprises copper, silver, chromium, gold, platinum, aluminum, silicon, germanium, gallium arsenide, ruthenium, titanium, or tantalum. The insulator comprises silicon dioxide, or silicon nitride.

POLYMERS - Preferred Material: The first electrode may comprise a conducting polymer.

Preferred Component: The redox-active molecule comprises porphyrin macrocycle, a metallocene, a linear polyene, cyclic polyene, heteroatom-substituted linear polyene, heteroatom-substituted cyclic polyene, tetrathiafulvalene, tetraselenafulvalene, metal coordination complex, buckball, triarylamine, 1,4-phenylenediamine, xanthene, flavin, phenazine, phenothiazine, acridine, quinoline, 2,2'-bipyridyl, 4,4'-bipyridyl, tetrathiotetracene, or peri-bridged naphthalene dichalcogenide. It may comprise porphyrin, expanded porphyrin, contracted porphyrin, ferrocene, linear porphyrin polymer, porphyrin sandwich complex, or porphyrin array. The organic molecule comprises a porphyrin macrocycle substituted at a beta-position or at a meso-position.

ORGANIC CHEMISTRY - Preferred Component: The binding partner comprises nucleic acid, protein, antibody, lectin, carbohydrate, or glycoprotein.

AN 2003-644858 [61] WPIX

L114 ANSWER 25 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2003-567427 [53] WPIX

DOC. NO. NON-CPI: N2003-451115 [53]

TITLE: Organic molecule coupling method for semiconductor fabrication, involves halogenating group four elements surface by solution contacting surface under condition when solvent is rapidly removed

DERWENT CLASS: U11; U14

INVENTOR: BOCIAN D F; DABKE R B;
KUHR W G; LINDSEY J S; LIU Z

PATENT ASSIGNEE: (REGC-C) UNIV CALIFORNIA

COUNTRY COUNT: 99

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| US 20030081463 | A1 | 20030501 | (200353)* | EN | 27[5] | |
| WO 2003038886 | A1 | 20030508 | (200353) | EN | | |
| AU 2002351504 | A1 | 20030512 | (200464) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|-----------------|----------|
| US 20030081463 | A1 | US 2001-40059 | 20011026 |
| AU 2002351504 | A1 | AU 2002-351504 | 20021014 |
| WO 2003038886 | A1 | WO 2002-US33045 | 20021014 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|-----------|------|-----------|
|-----------|------|-----------|

AU 2002351504 A1 Based on WO 2003038886 A

PRIORITY APPLN. INFO: US 2001-40059 20011026
ED 20050531
TI Organic molecule coupling method for **semiconductor**
fabrication, involves halogenating group four elements surface by
solution contacting surface under condition when solvent is
rapidly removed
TT TT: ORGANIC MOLECULAR COUPLE METHOD **SEMICONDUCTOR**
FABRICATE HALOGENATED GROUP FOUR ELEMENT SURFACE SOLUTION
CONTACT CONDITION SOLVENT RAPID REMOVE
IN BOCIAN D F; DABKE R B; KUHR W G;
LINDSEY J S; LIU Z
USE USE - Used in **semiconductor** fabrication to couple
organic molecules with the group four elements e.g.
silicon and germanium.
AN 2003-567427 [53] WPIX
DC U11; U14
IC ICM G11C007-00; H01L021-3205
ICS H01L021-4763
MC EPI: U11-C01J5; U14-A03X

=>

=> d his nofile

(FILE 'HOME' ENTERED AT 15:02:09 ON 22 JAN 2007)

FILE 'HCAPLUS' ENTERED AT 15:06:14 ON 22 JAN 2007
L1 1 SEA ABB=ON PLU=ON US2001-040059/APPS
D ALL

FILE 'ZCAPLUS' ENTERED AT 15:07:44 ON 22 JAN 2007
L2 QUE ABB=ON PLU=ON BOCIAN D?/AU
L3 QUE ABB=ON PLU=ON KUHR W?/AU
L4 QUE ABB=ON PLU=ON LINDSEY J?/AU
L5 QUE ABB=ON PLU=ON DABKE R?/AU
L6 QUE ABB=ON PLU=ON LIU Z?/AU
L7 QUE ABB=ON PLU=ON LIU ZHIMING?/AU
L8 QUE ABB=ON PLU=ON (L2 OR L3 OR L4 OR L5) OR L7
L9 QUE ABB=ON PLU=ON L2 AND L3 AND L4 AND L5 AND L6

FILE 'HCAPLUS' ENTERED AT 15:11:11 ON 22 JAN 2007
L10 4 SEA ABB=ON PLU=ON L2 AND L3 AND L4 AND L5 AND L6
D SCAN
L11 968 SEA ABB=ON PLU=ON (L2 OR L3 OR L4 OR L5) OR L7

FILE 'NTIS, COMPENDEX, INSPEC, SOLIDSTATE, CERAB, CONFSCI,
DISSABS, WPIX' ENTERED AT 15:16:40 ON 22 JAN 2007
L12 689 SEA ABB=ON PLU=ON L8
L13 39 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
AND L12
D 1-39 TI
L14 19 SEA ABB=ON PLU=ON L13 AND PORPHYRIN?
L15 21 SEA ABB=ON PLU=ON L13 AND (SILICON? OR GROUP(W) (IV
OR 4))
L16 13 SEA ABB=ON PLU=ON L14 AND L15
D 1-13 TI
L17 27 SEA ABB=ON PLU=ON L14 OR L15
D L17 1-17 TI
D QUE
L18 667 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
AND PORPHYRIN?

L19 438489 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
AND (SILICON? OR GROUP(W) (IV OR 4))
L20 81 SEA ABB=ON PLU=ON L18 AND L19
L21 16 SEA ABB=ON PLU=ON L20 AND (MONOLAYER? OR MONO(W)
LAYER? OR SELF(N) ASSEMBL?)
D 1-16
L22 61 SEA ABB=ON PLU=ON L20 AND (SUBSTRAT? OR SURFACE? OR
BASE# OR SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR
FOUNDATION? OR PANE? OR DISK? OR DISC# OR WAFER? OR
PLATE OR PLATES)
L23 3 SEA ABB=ON PLU=ON L22 AND PASSIVAT?
D 1-3
D 1-3 KWIC
L24 5139 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
AND (?PORPHYRIN? OR ?PORPHIN? OR CHLORIN OR HEMIN? OR
?PHTHALOCYAN?)
L25 581 SEA ABB=ON PLU=ON L24 AND L19
D QUE L22
L26 455 SEA ABB=ON PLU=ON L25 AND (SUBSTRAT? OR SURFACE? OR
BASE# OR SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR
FOUNDATION? OR PANE? OR DISK? OR DISC# OR WAFER? OR
PLATE OR PLATES).
L27 56 SEA ABB=ON PLU=ON L26 AND (MONOLAYER? OR MONO(W)
LAYER? OR SELF(N) ASSEMBL?)
L28 54 SEA ABB=ON PLU=ON L26 AND (HALOGENAT? OR IODIN? OR
BROMIN? OR CHLORIN? OR FLUORIN?)
D 1-5 KWIC
L29 3 SEA ABB=ON PLU=ON L26 AND (DOPE# OR DOPING? OR
DOPANT?) (6N) ((N OR P) (3N) TYPE)
D 1-3 KWIC
L30 62 SEA ABB=ON PLU=ON L26 AND (DOPE# OR DOPING? OR
DOPANT?)
L31 53 SEA ABB=ON PLU=ON L26 AND ((N OR P) (3N) TYPE)
L32 14 SEA ABB=ON PLU=ON L30 AND L31
D 1-14 KWIC
L33 188 SEA ABB=ON PLU=ON (L27 OR L28 OR L29 OR L30 OR L31
OR L32)
L34 189 SEA ABB=ON PLU=ON L33 OR L21 OR L23
L35 49 SEA ABB=ON PLU=ON L34 AND (ALCOHOL? OR OH OR
HYDROXY?)
D 1-5 KWIC
L36 2 SEA ABB=ON PLU=ON L35 AND (((SILICON OR SI) (N) (OXYGEN
OR O)) (3N) BOND?)
D 1-2 KWIC
L37 3 SEA ABB=ON PLU=ON L26 AND (((SILICON OR SI) (N) (OXYGEN
OR O)) (3N) BOND?)
D 1-3 KWIC
L38 3 SEA ABB=ON PLU=ON L25 AND (((SILICON OR SI) (N) (OXYGEN
OR O)) (3N) BOND?)
L39 9 SEA ABB=ON PLU=ON L23 OR L29 OR (L36 OR L37)
D 1-9 KWIC
L40 56 SEA ABB=ON PLU=ON L27 AND ((L28 OR L29 OR L30 OR L31
OR L32 OR L33 OR L34 OR L35 OR L36 OR L37 OR L38 OR
L39))
D QUE
L41 55 SEA ABB=ON PLU=ON L40 NOT L39
L42 22 SEA ABB=ON PLU=ON L27 AND (L28 OR L30 OR L31 OR L35)

D 1-22
L43 14 SEA ABB=ON PLU=ON L28 AND (L30 OR L31)
L44 16 SEA ABB=ON PLU=ON L28 AND L35
L45 35 SEA ABB=ON PLU=ON L39 OR L43 OR L44
L46 52 SEA ABB=ON PLU=ON L45 OR L42
L47 7 SEA ABB=ON PLU=ON L46 AND L12
L48 45 SEA ABB=ON PLU=ON L46 NOT L47
L49 20 SEA ABB=ON PLU=ON L17 NOT L47
D L47 1-7 KWIC

10/0400059

D L17 1-27 TI

FILE 'HCAPLUS' ENTERED AT 16:15:34 ON 22 JAN 2007
D SCAN L10

L50 171851 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
AND (SILICON? OR GROUP(W) (IV OR 4))

FILE 'ZCAPLUS' ENTERED AT 16:17:57 ON 22 JAN 2007

FILE 'REGISTRY' ENTERED AT 16:19:07 ON 22 JAN 2007
E SILICON/CN

L51 1 SEA ABB=ON PLU=ON SILICON/CN
D SCAN
L52 1 SEA ABB=ON PLU=ON PORPHYRIN/CN
L53 1 SEA ABB=ON PLU=ON PHTHALOCYANINE/CN
L54 1 SEA ABB=ON PLU=ON CHLORIN/CN
L55 1 SEA ABB=ON PLU=ON HEMIN/CN

FILE 'HCAPLUS' ENTERED AT 16:22:08 ON 22 JAN 2007

L56 QUE ABB=ON PLU=ON L51 OR SILICON OR SI
L57 632 SEA ABB=ON PLU=ON L52/D OR L52/DP
L58 2851 SEA ABB=ON PLU=ON L53/D OR L53/DP
L59 119 SEA ABB=ON PLU=ON L54/D OR L54/DP
L60 220 SEA ABB=ON PLU=ON L55/D OR L55/DP
E PORPHYRIN/CT
L61 82774 SEA ABB=ON PLU=ON PORPHYRINS+PFT, OLD, NT/CT
L62 8102 SEA ABB=ON PLU=ON PHTHALOCYANINE+PFT, OLD, NT/CT
L63 82774 SEA ABB=ON PLU=ON L61 OR L62
E SILICON+PFT, OLD, NT/CT
E SILICON/CT
L64 458816 SEA ABB=ON PLU=ON SILICON+PFT, OLD, NT/CT
L65 QUE ABB=ON PLU=ON ?PORPHYRIN? OR ?PORPHIN? OR
CHLORIN OR HEMIN? OR ?PHTHALOCYAN?

FILE 'ZCAPLUS' ENTERED AT 16:33:05 ON 22 JAN 2007

L66 QUE ABB=ON PLU=ON (DOPE# OR DOPING? OR DOPANT?) (L) ((N
OR P) (L) TYPE)
L67 QUE ABB=ON PLU=ON PASSIVATION+PFT, OLD, NT/CT
L68 QUE ABB=ON PLU=ON "SURFACE TREATMENT"+PFT, OLD, NT/CT
L69 QUE ABB=ON PLU=ON "SELF-ASSEMBLED MONOLAYERS"+PFT, OLD
, NT/CT
L70 QUE ABB=ON PLU=ON SUBSTRAT? OR SURFACE? OR BASE# OR
SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR FOUNDATION
? OR PANE? OR DISK? OR DISC# OR WAFER? OR PLATE OR
PLATES
L71 QUE ABB=ON PLU=ON OXYGEN OR O
D QUE L28
L72 QUE ABB=ON PLU=ON (HALOGENAT? OR IODIN? OR BROMIN?
OR CHLORIN? OR FLUORIN?)
L73 QUE ABB=ON PLU=ON (HYDROGEN OR H) (L) (PASSIVAT? OR
L67)
D QUE L***
L74 QUE ABB=ON PLU=ON L56 OR L64

FILE 'HCAPLUS' ENTERED AT 16:44:17 ON 22 JAN 2007

L75 5118 SEA ABB=ON PLU=ON L50 AND L74 AND ((L57 OR L58 OR
L59 OR L60) OR L66 OR L63)
D QUE
L76 3618 SEA ABB=ON PLU=ON L75 AND L70
D QUE L74
L77 421250 SEA ABB=ON PLU=ON L74 (L) L70
L78 2919 SEA ABB=ON PLU=ON L76 AND L77
D QUE
L79 2882 SEA ABB=ON PLU=ON L78 AND L66
L80 QUE ABB=ON PLU=ON (L56(A) L71) (3A) BOND?
L81 2 SEA ABB=ON PLU=ON L79 AND L80
D 1-2 KWIC

D QUE
 D QUE L75
 L82 94 SEA ABB=ON PLU=ON L50 AND L74 AND ((L57 OR L58 OR
 L59 OR L60) OR L63)
 D QUE
 L83 59 SEA ABB=ON PLU=ON L82 AND L70
 L84 1 SEA ABB=ON PLU=ON L83 AND L66
 D KWIC
 L85 38 SEA ABB=ON PLU=ON L82 AND L77
 D 1-5 KWIC
 L86 1 SEA ABB=ON PLU=ON L85 AND L66
 D KWIC
 L87 0 SEA ABB=ON PLU=ON L85 AND L80
 L88 2 SEA ABB=ON PLU=ON L76 AND L80
 D 1-2 KWIC
 L89 QUE ABB=ON PLU=ON (L56(A)L71)(L)BOND?
 L90 2 SEA ABB=ON PLU=ON L78 AND L89
 D 1-2 KWIC
 D QUE
 L91 0 SEA ABB=ON PLU=ON L90 AND ((L57 OR L58 OR L59 OR
 L60) OR L63)
 D QUE
 D 1-9 KWIC
 L92 6269 SEA ABB=ON PLU=ON (L56(A)L71)(3A)BOND?
 D 1-9 KWIC
 L93 QUE ABB=ON PLU=ON (L56(A)L71)(2A)BOND?
 L94 5889 SEA ABB=ON PLU=ON (L56(A)L71)(2A)BOND?
 D QUE L82
 L95 186319 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
 AND L74
 L96 350 SEA ABB=ON PLU=ON L95 AND ((L57 OR L58 OR L59 OR L60
 OR L61 OR L62 OR L63) OR L65)
 D QUE
 L97 2 SEA ABB=ON PLU=ON L96 AND L80
 D 1-2 KWIC
 D QUE L96
 L98 252 SEA ABB=ON PLU=ON L96 AND L70
 L99 187 SEA ABB=ON PLU=ON L96 AND L77
 L100 5 SEA ABB=ON PLU=ON L99 AND L66
 D 1-5 KWIC
 L101 5 SEA ABB=ON PLU=ON L98 AND L66
 L102 10 SEA ABB=ON PLU=ON L99 AND L72
 D 1-10 KWIC
 L103 4 SEA ABB=ON PLU=ON L99 AND L73
 D SCAN
 L104 2 SEA ABB=ON PLU=ON L96 AND L93
 D 1-2 KWIC
 D QUE L27
 L105 QUE ABB=ON PLU=ON MONOLAYER? OR MONO(W) LAYER? OR
 SELF(A)ASSEMBL? OR L69
 L106 20 SEA ABB=ON PLU=ON L81 OR L84 OR L88 OR L90 OR L97 OR
 (L100 OR L101 OR L102 OR L103 OR L104)
 D SCAN
 L107 12 SEA ABB=ON PLU=ON L99 AND (COAT? OR FILM?) AND (BASE
 OR BASIC)
 D 1-12 KWIC
 L108 31 SEA ABB=ON PLU=ON L106 OR L107
 L109 3 SEA ABB=ON PLU=ON L8 AND L108
 D 1-3 KWIC
 L110 28 SEA ABB=ON PLU=ON L108 NOT L109
 L111 11 SEA ABB=ON PLU=ON L8 AND L96
 D 1-11 KWIC
 L112 13 SEA ABB=ON PLU=ON L109 OR L111 OR L10

FILE 'STNGUIDE' ENTERED AT 17:31:39 ON 22 JAN 2007
 D QUE L110
 D QUE L48

10/0400059

FILE 'HCAPLUS, COMPENDEX, INSPEC, DISSABS, WPIX' ENTERED AT
17:32:45 ON 22 JAN 2007

L113 72 DUP REM L110 L48 (1 DUPLICATE REMOVED)
 ANSWERS '1-28' FROM FILE HCAPLUS
 ANSWER '29' FROM FILE COMPENDEX
 ANSWERS '30-33' FROM FILE INSPEC
 ANSWER '34' FROM FILE DISSABS
 ANSWERS '35-72' FROM FILE WPIX
D L113 1-28 IBIB ABS ED HITSTR HITIND
D L113 29-34 IBIB ED AB IND
D L113 35-72 IALL ABEQ TECH ABEX
D QUE L112
D QUE L47
D QUE L49

FILE 'HCAPLUS, COMPENDEX, SOLIDSTATE, WPIX, INSPEC, DISSABS'
ENTERED AT 17:42:51 ON 22 JAN 2007

L114 31 DUP REM L112 L47 L49 (9 DUPLICATES REMOVED)
 ANSWERS '1-13' FROM FILE HCAPLUS
 ANSWERS '14-17' FROM FILE COMPENDEX
 ANSWER '18' FROM FILE SOLIDSTATE
 ANSWERS '19-25' FROM FILE WPIX
 ANSWERS '26-29' FROM FILE INSPEC
 ANSWERS '30-31' FROM FILE DISSABS
D L114 1-13 IBIB ABS ED HITSTR HITIND
D L114 14-17,26-31 IBIB ED
D L114 19-25 IBIB ED HIT IND

IT Oxidation kinetics
 Redox reaction
 Redox reaction kinetics
 (electrochem.; of (hydroxymethyl)phenylferrocene and zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 on p-type Si(100) microelectrodes in propylene
 carbonate containing Bu4NPF6)

IT Electric charge
 Monolayers
 Semiconductor devices
 (measurements of electron-transfer rates of charge-storage mol.
 monolayers on Si(100) toward hybrid mol./
 semiconductor information storage devices)

IT Electron transfer kinetics
 (of (hydroxymethyl)phenylferrocene and zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 attached to Si surface through Si
 -O bond)

IT Cyclic voltammetry
 Oxidation, electrochemical
 (of (hydroxymethyl)phenylferrocene and zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 on p-type Si(100) microelectrodes in propylene
 carbonate containing Bu4NPF6)

IT 1333-74-0, Hydrogen, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (Si passivated with hydrogen and
 reaction of hydride-passivated Si with
 iodine in fabrication of monolayers of
 (hydroxymethyl)phenylferrocene or Zn [(hydroxymethyl)phenyl]
 trimesitylporphyrin on silicon
 microelectrode)

IT 3109-63-5, Tetrabutylammonium hexafluorophosphate
 RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
 (cyclic voltammetry of (hydroxymethyl)phenylferrocene and zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 on p-type Si(100) microelectrodes in propylene
 carbonate containing Bu4NPF6)

IT 485370-30-7, 4-(Hydroxymethyl)phenylferrocenium
 RL: FMU (Formation, unclassified); PRP (Properties); FORM
 (Formation, nonpreparative)
 (electrochem. oxidative formation in cyclic voltammetry of
 (hydroxymethyl)phenylferrocene monolayers on p-type Si
 (100) microelectrodes in propylene carbonate containing Bu4NPF6)

IT 485370-27-2
 RL: FMU (Formation, unclassified); PRP (Properties); FORM
 (Formation, nonpreparative)
 (electrochem. oxidative formation in cyclic voltammetry of zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 on p-type Si(100) microelectrodes in propylene
 carbonate containing Bu4NPF6)

IT 485370-25-0
 RL: FMU (Formation, unclassified); PRP (Properties); RCT
 (Reactant); FORM (Formation, nonpreparative); RACT (Reactant or
 reagent)
 (electrochem. oxidative formation in cyclic voltammetry of zinc
 [(hydroxymethyl)phenyl]trimesitylporphyrin monolayers
 on p-type Si(100) microelectrodes in propylene
 carbonate containing Bu4NPF6)

IT 12155-54-3D, reaction products with iodine-modified
 silicon 485370-19-2D, reaction products with
 iodine-modified silicon
 RL: CPS (Chemical process); DEV (Device component use); PEP
 (Physical, engineering or chemical process); PRP (Properties);
 PROC (Process); USES (Uses)
 (in monolayer preparation on microelectrodes and determination of
 electron-transfer rates of charge-storage mol. monolayers on

**Si(100) in relation to hybrid mol./
semiconductor information storage)**

IT 7440-21-3, **Silicon**, uses

RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)

(measurements of electron-transfer rates of charge-storage mol. monolayers on Si(100) toward hybrid mol./
semiconductor information storage devices)

IT 12155-54-3P, 4-(Hydroxymethyl)phenylferrocene 485370-19-2P

RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(preparation and attachment to Si with Si-O bond formation and determination of electron-transfer rates of charge-storage mol. monolayers on Si(100) in relation to hybrid mol./
semiconductor information storage devices)

IT 7553-56-2, **Iodine**, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction with hydride-passivated Si in modification of Si with ferrocenylbenzyl alc. or zinc hydroxymethylphenyltrimesitylporphyrin)

REFERENCE COUNT: 92 THERE ARE 92 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L114 ANSWER 8 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2006:858545 HCPLUS Full-text

TITLE: Infrared spectroscopy of Si (100)/molecule/metal interfaces

AUTHOR(S): Bocian, David F.; Anariba, Franklin

CORPORATE SOURCE: Department of Chemistry, University of California, Riverside, Riverside, CA, 92521, USA

SOURCE: Abstracts of Papers, 232nd ACS National Meeting, San Francisco, CA, United States, Sept. 10-14, 2006 (2006), COLL-260. American Chemical Society: Washington, D. C.

CODEN: 69IHRD

DOCUMENT TYPE: Conference; Meeting Abstract; (computer optical disk)

LANGUAGE: English

AB The promise of incorporating mols. into microelectronic devices has stimulated a variety of approaches to making metal/mol./metal and **semiconductor**/mol./metal junctions for applications ranging from mol. diodes to memory devices. However, the fate of mols. upon top-metal deposition is generally not well characterized. Towards this goal, **silicon** surfaces were modified with monolayers of **porphyrins** that were covalently attached via carbosilane linkages using a high temperature (400 °C under inert atmospheric) baking method. Subsequently, thin films (3 - 8 nm thick) of silver, gold, and copper were deposited onto the mols. by electron-beam evaporation at low pressures. Attenuated total reflectance Fourier-transform IR spectroscopy (ATR-FTIR) was employed to interrogate the tethered **porphyrins** in the buried interface, and thereby assess their integrity upon top-metal deposition, and to examine metal - organic functional group interaction.

ED Entered STN: 25 Aug 2006

L114 ANSWER 9 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2006:858536 HCPLUS Full-text

TITLE: Fabrication and characterization of multiporphyrin-imide on Si (100) for molecular-based information-storage devices

AUTHOR(S): Jiao, Jieying; Anariba, Franklin; Tiznado, Hugo; Schmidt, Izabela; Lindsey, Jonathan S.; Zaera, Francisco; Bocian, David F.

10/0400059

CORPORATE SOURCE: Department of Chemistry, University of California, Riverside, Riverside, CA, 92521-0403, USA
SOURCE: Abstracts of Papers, 232nd ACS National Meeting, San Francisco, CA, United States, Sept. 10-14, 2006 (2006), COLL-250. American Chemical Society: Washington, D. C.
DOCUMENT TYPE: Conference; Meeting Abstract; (computer optical disk)
LANGUAGE: English
AB A major challenge in mol. electronics and related fields entails the fabrication of elaborate mol. architectures on electroactive surfaces to yield hybrid mol.-semiconductor systems. A method has been developed for the stepwise synthesis of oligomers of **porphyrins** linked covalently via imide units. A triallyl-**porphyrin** bearing an amino group serves as the **base** unit on Si(100). The alternating use of a dianhydride and a **porphyrin**-diamine for reaction enables the rapid and simple buildup of oligomers composed of 2-5 **porphyrins**. The charge densities of the **porphyrin** oligomers were determined via electrochem. methods and the stepwise growth of **porphyrin** was evaluated in detail via FTIR and XPS studies. The thickness is also evaluated by using a combination of ellipsometry, AFM height profiling and XPS. These studies indicated that high charge d., ultra-thin **multiporphyrin** films with relative well-controlled thickness can be grown in a stepwise fashion using the imide-forming reaction.
ED Entered STN: 25 Aug 2006

L114 ANSWER 10 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2004:223805 HCPLUS Full-text
TITLE: Fabrication and electrochemical characterization of **porphyrin**-based molecular memory devices
AUTHOR(S): Wei, Lingyun; Liu, Zhiming; Yasseri, Amir A.; Lindsey, Jonathan S.; Bocian, David F.
CORPORATE SOURCE: Department of Chemistry, University of California, Riverside, Riverside, CA, 92521, USA
SOURCE: Abstracts of Papers, 227th ACS National Meeting, Anaheim, CA, United States, March 28-April 1, 2004 (2004), COLL-202. American Chemical Society: Washington, D. C.
DOCUMENT TYPE: Conference; Meeting Abstract
LANGUAGE: English
AB The integration of mol. components with **semiconductor** platforms provides the basis for hybrid mol. **semiconductor** electronic devices. Towards this goal, we have examined the characteristics of various redox-active **porphyrin** monolayers attached to patterned Si (100) surfaces via a Si-C bond. The formation of monolayers on Si was confirmed by fast scan cyclic voltammetry. The electrochem. properties were investigated for both liquid and gel electrolytes. Gel electrolytes afford the advantage of solid-state packaging, which is necessary for real devices. Electrochem. impedance spectroscopy was used to measure the conductivity of gel electrolytes. The electron-transfer rates and charge retention characteristics of the memory cell were examined by swept waveform AC voltammetry and open circuit potential amperometry, resp.
ED Entered STN: 21 Mar 2004

L114 ANSWER 11 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2003:356737 HCPLUS Full-text
DOCUMENT NUMBER: 138:347493
TITLE: Formation of self-assembled monolayers on silicon substrates
INVENTOR(S): Bocian, David F.; Kuhr, Werner G.; Lindsey, Jonathan S.; Dabke, Rajeeve Balkrishna; Liu, Zhiming
PATENT ASSIGNEE(S): The Regents of the University of California,
USA

SOURCE: PCT Int. Appl., 69 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---------------|-------|----------|-----------------|--------------|
| ----- | ----- | ----- | ----- | ----- |
| WO 2003038886 | A1 | 20030508 | WO 2002-US33045 | 2002 1014 |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
 CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI,
 GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,
 KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
 MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE,
 SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC,
 VN, YU, ZA, ZM, ZW
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
 AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ,
 DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT,
 SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML,
 MR, NE, SN, TD, TG

PRIORITY APPLN. INFO.: US 2001-40059 A
 2001
 1026

AB This invention provides a new method of forming a self-assembling monolayer (SAM) of alc.-terminated or thiol-terminated organic mols. (e.g. ferrocenes, porphyrins, etc.) on a silicon or other group IV element surface. The assembly is based on the formation of an E-O- or an E-S- bond where E is the group IV element (e.g. Si, Ge, etc.). The procedure has been successfully used on both p- and n-type group IV element surfaces. The assemblies are stable under ambient conditions and can be exposed to repeated electrochem. cycling.

ED Entered STN: 09 May 2003

IC ICM H01L021-3205

ICS H01L021-4763

CC 76-3 (Electric Phenomena)

ST self assembled monolayer formation silicon substrate

IT Self-assembled monolayers

 Semiconductor device fabrication
 (formation of self-assembled monolayers on silicon
 substrates)

IT Porphyrins

RL: DEV (Device component use); USES (Uses)
 (method of forming self-assembling monolayer of alc.-terminated
 or thiol-terminated organic mols.)

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE
 FOR THIS RECORD. ALL CITATIONS AVAILABLE
 IN THE RE FORMAT

L114 ANSWER 12 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:599474 HCPLUS Full-text

DOCUMENT NUMBER: 137:344418

TITLE: Capacitance and conductance characterization
 of ferrocene-containing self-assembled
 monolayers on silicon surfaces for memory
 applications

AUTHOR(S): Li, Qiliang; Mathur, Guru; Homsi, Mais;
 Surthi, Shyam; Misra, Veena; Malinovskii,
 Vladimir; Schweikart, Karl-Heinz; Yu, Lianhe;
 Lindsey, Jonathan S.; Liu,
 Zhiming; Dabke, Rajeev B.;
 Yasseri, Amir; Bocian, David F.;
 Kuhr, Werner G.

10/0400059

CORPORATE SOURCE: Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC, 27695, USA
SOURCE: Applied Physics Letters (2002), 81(8), 1494-1496
CODEN: APPLAB; ISSN: 0003-6951
PUBLISHER: American Institute of Physics
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Self-assembled monolayers of 4-ferrocenylbenzyl alc. attached to Si provided the basis for electrolyte-mol.-Si capacitors. Characterization by conventional capacitance and conductance techniques showed very high capacitance and conductance peaks near apprx.0.6 V associated with charging and discharging of electrons into and from discrete levels in the monolayer owing to the presence of the redox-active ferrocenes. The reversible charge trapping of these mols. suggest their potential application in memory devices. Due to the mol. scalability and low-power operation, mol.-Si hybrid devices may be strong candidates for next-generation electronic devices.
ED Entered STN: 12 Aug 2002
CC 76-3 (Electric Phenomena)
Section cross-reference(s): 78
REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L114 ANSWER 13 OF 31 HCPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2001:199538 HCPLUS Full-text
TITLE: Porphyrin based molecular memory: Development of "solid state" device
AUTHOR(S): Dabke, Rajeev; Yasseri, Amir A.; Liu, Zhiming; Kuhr, Werner G.; Bocian, David F.; Lindsey, Johnathan S.
CORPORATE SOURCE: Department of Chemistry, University of California-Riverside, Riverside, CA, 92521, USA
SOURCE: Abstracts of Papers, 221st ACS National Meeting, San Diego, CA, United States, April 1-5, 2001 (2001) COLL-284
CODEN: 69FZD4
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal; Meeting Abstract
LANGUAGE: English
AB Development of a mol. memory device based on redox process requires a robust, reversible and electrochem. stable system. Towards this end, we have demonstrated that porphyrin and phthalocyanine derivs. self-assembled on gold meets these conditions (1,2). A practical device requires solid-state assembly and packaging. Herein, we describe the investigation of a number of gel-based "solid state" electrolyte systems. These systems are found to exhibit similar performance characteristics to those previously observed for traditional electrochem. solvent/electrolyte systems.
ED Entered STN: 22 Mar 2001

=> d 1114 14-17,26-31 ibib ed

L114 ANSWER 14 OF 31 COMPENDEX COPYRIGHT 2007 EEI on STN DUPLICATE
5
ACCESSION NUMBER: 2004(10):2684 COMPENDEX Full-text
TITLE: Multibit memory using **self-assembly** of mixed ferrocene/porphyrin monolayers on silicon.
AUTHOR: Li, Qiliang (Department of Elec. and Comp. Eng. North Carolina State University, Raleigh, NC 27695, United States); Mathur, Guru; Gowda, Srivardhan; Surthi, Shyam; Zhao, Qian; Yu, Lianhe; Lindsey, Jonathan S.; Bocian, David F.; Misra, Veena

SOURCE: Advanced Materials v 16 n 2 Jan 16 2004 2004.p
133-137

SOURCE: Advanced Materials v 16 n 2 Jan 16 2004 2004.p
133-137

PUBLICATION YEAR: 2004

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

L114 ANSWER 15 OF 31 COMPENDEX COPYRIGHT 2007 EEI on STN
ACCESSION NUMBER: 2004(18):10865 COMPENDEX Full-text
TITLE: Integration of molecular components into
silicon memory devices.

AUTHOR: Kuhr, Werner G. (Chemistry Faculty
University of California, Riverside, CA,
United States)

SOURCE: Electrochemical Society Interface v 13 n 1
Spring 2004 2004.p 34-38

SOURCE: Electrochemical Society Interface v 13 n 1
Spring 2004 2004.p 34-38

PUBLICATION YEAR: 2004

DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical

LANGUAGE: English

L114 ANSWER 16 OF 31 COMPENDEX COPYRIGHT 2007 EEI on STN
ACCESSION NUMBER: 2001(45):3755 COMPENDEX Full-text
TITLE: Capacitance voltage characteristics of
polysilicon - Polysilicon oxide - Polysilicon
structures for three-dimensional memory.

AUTHOR: Lindsey, J.R. (Microelectronics Res.
Laboratories Dept. of Electrical and Comp.
Eng. University of Colorado, Colorado Springs,
CO 80933-7150, United States); Kalkur, T.S.

MEETING TITLE: Amorphous and Heterogeneous Silicon Thin
Films-2000.

MEETING LOCATION: San Francisco, CA, United States

MEETING DATE: 24 Apr 2000-28 Apr 2000

SOURCE: Materials Research Society Symposium -
Proceedings v 609 2000.p A2921-A2926

SOURCE: Materials Research Society Symposium -
Proceedings v 609 2000.p A2921-A2926

PUBLICATION YEAR: 2000

MEETING NUMBER: 58627

DOCUMENT TYPE: Conference Article

TREATMENT CODE: Theoretical; Experimental

LANGUAGE: English

L114 ANSWER 17 OF 31 COMPENDEX COPYRIGHT 2007 EEI on STN
ACCESSION NUMBER: 2001(1):4903 COMPENDEX Full-text
TITLE: Molecular approach toward information storage
based on the redox properties of
porphyrins in self-assembled
monolayers.

AUTHOR: Roth, Kristian M. (Univ of California,
Riverside, CA, USA); Dontha, Narasaiah;
Dabke, Rajeev B.; Gryko, Daniel T.;
Clausen, Christian; Lindsey, Jonathan
S.; Bocian, David F.;
Kuhr, Werner G.

SOURCE: Journal of Vacuum Science and Technology B:
Microelectronics and Nanometer Structures v 18
n 5 Sep 2000. p 2359-2364, American Inst of
Physics, Woodbury, NY, USA

SOURCE: Journal of Vacuum Science and Technology B:
 Microelectronics and Nanometer Structures v 18
 n 5 Sep 2000. p 2359-2364, American Inst of
 Physics, Woodbury, NY, USA
 CODEN: JVTBD9 ISSN: 0734-211X

PUBLICATION YEAR: 2000
 DOCUMENT TYPE: Journal
 TREATMENT CODE: Theoretical; Experimental
 LANGUAGE: English

L114 ANSWER 26 OF 31 INSPEC (C) 2007 IET on STN
 ACCESSION NUMBER: 2003:7672169 INSPEC Full-text
 DOCUMENT NUMBER: B2003-08-2550N-020
 TITLE: Electrical characterization of redox-active
 molecular monolayers on SiO₂ for memory
 applications

AUTHOR: Qiliang Li; Surthi, S.; Mathur, G.; Gowda, S.;
 Misra, V.; (Dept. of Electr. & Comput. Eng.,
 North Carolina State Univ., Raleigh, NC, USA),
 Sorenson, T.A.; Tenent, R.C.; Kuhr,
 W.G.; Tamari, S.; Lindsey, J.S.
 ; Zhiming Liu; Bocian, D.F.

SOURCE: Applied Physics Letters (7 July 2003), vol.83,
 no.1, p. 198-200, 12 refs.
 CODEN: APPLAB, ISSN: 0003-6951
 SICI: 0003-6951(20030707)83:1L.198:ECRA;1-8
 Price: 01/03/6951/2003/83(1)/198(3) /\$20.00
 Doc.No.: S0003-6951(03)05924-2
 Published by: AIP, USA

DOCUMENT TYPE: Journal
 TREATMENT CODE: Practical; Experimental
 COUNTRY: United States
 LANGUAGE: English
 ED 20050421

L114 ANSWER 27 OF 31 INSPEC (C) 2007 IET on STN
 ACCESSION NUMBER: 2004:7862307 INSPEC Full-text
 DOCUMENT NUMBER: B2004-03-1265D-099; C2004-03-5320Z-004
 TITLE: Hybrid silicon/molecular memories:
 co-engineering for novel functionality
 AUTHOR: Gowda, S.; Mathur, G.; Qihang Li; Surthi, S.;
 Qian Zhao; (Dept. of Electr. & Comput. Eng.,
 North Carolina State Univ., Raleigh, NC, USA),
 Lindsey, J.S.; Mobley, K.;
 Bocian, D.F.; Misra, V.

SOURCE: IEEE International Electron Devices Meeting
 2003, 2003, p. 22.1.1-4 of 999 pp., 10 refs.
 ISBN: 0 7803 7872 5
 Price: 0-7803-7872-5/03/\$17.00
 Published by: IEEE, Pisacataway, NJ, USA
 Conference: IEEE International Electron
 Devices Meeting 2003, Washington, DC, USA,
 8-10 Dec. 2003

DOCUMENT TYPE: Conference; Conference Article
 TREATMENT CODE: Practical; Experimental
 COUNTRY: United States
 LANGUAGE: English
 ED 20050422

L114 ANSWER 28 OF 31 INSPEC (C) 2007 IET on STN
 ACCESSION NUMBER: 2002:7481410 INSPEC Full-text
 DOCUMENT NUMBER: B2003-01-1265D-039
 TITLE: Polysilicon thin film transistor and EEPROM
 characteristics for three dimensional memory
 AUTHOR: Lindsey, J.R.; Kalkur, T.S. (Dept.
 of Electr. & Comput. Eng., Colorado Univ.,
 Colorado Springs, CO, USA)

SOURCE: Thin Film Transistor Technologies V.
 Proceedings of the International Symposium
 (Electrochemical Society Proceedings
 Vol.2000-31), 2001, p. 312-19 of xi+340 pp., 6
 refs.
 Editor(s): Kuo, Y.
 ISBN: 1 56677 298 2
 Published by: Electrochem. Soc, Pennington,
 NJ, USA
 Conference: Thin Film Transistor Technologies
 V. Proceedings of the International Symposium,
 Phoenix, AZ, USA, 23-25 Oct. 2000
 Conference; Conference Article
 DOCUMENT TYPE:
 TREATMENT CODE: Experimental
 COUNTRY: United States
 LANGUAGE: English
 ED 20050421

L114 ANSWER 29 OF 31 INSPEC (C) 2007 IET on STN
 ACCESSION NUMBER: 2002:7174387 INSPEC Full-text
 DOCUMENT NUMBER: B2002-03-2130-006
 TITLE: Capacitance voltage characteristics of
 polysilicon-polysilicon oxide-polysilicon
 structures for three-dimensional memory
 AUTHOR: Lindsey, J.R.; Kalkur, T.S. (Dept.
 of Electr. & Comput. Eng., Colorado Univ.,
 Colorado Springs, CO, USA)
 SOURCE: Amorphous and Heterogeneous Silicon Thin Films
 - 2000. Symposium (Materials Research Society
 Symposium Proceedings Vol.609), 2001, p.
 A29.2.1-6 of xxv+1082 pp., 10 refs.
 Editor(s): Collins, R.W.; Branz, H.M.;
 Stutzmann, M.; Guha, S.; Okamoto, H.
 ISBN: 1 55899 517 X
 Published by: Mater. Res. Soc, Warrendale, PA,
 USA
 Conference: Amorphous and Heterogeneous
 Silicon Thin Films - 2000. Symposium, San
 Francisco, CA, USA, 24-28 April 2000
 Conference; Conference Article
 DOCUMENT TYPE:
 TREATMENT CODE: Practical; Theoretical; Experimental
 COUNTRY: United States
 LANGUAGE: English
 ED 20050420

L114 ANSWER 30 OF 31 DISSABS COPYRIGHT (C) 2007 ProQuest Information
 and Learning Company; All Rights Reserved on STN
 ACCESSION NUMBER: 2006:62066 DISSABS Order Number: AAI3210427
 TITLE: Characterization of the porphyrinic
 architectures for use in molecular information
 storage applications
 AUTHOR: Wei, Lingyun [Ph.D.]; Bocian, David F.
 [advisor]
 CORPORATE SOURCE: University of California, Riverside (0032)
 SOURCE: Dissertation Abstracts International, (2006) Vol.
 67, No. 3B, p. 1418. Order No.: AAI3210427. 199
 pages.
 ISBN: 978-0-542-59981-1.
 DOCUMENT TYPE: Dissertation
 FILE SEGMENT: DAI
 LANGUAGE: English
 ENTRY DATE: Entered STN: 20061127
 Last Updated on STN: 20061127
 ED Entered STN: 20061127
 Last Updated on STN: 20061127

L114 ANSWER 31 OF 31 DISSABS COPYRIGHT (C) 2007 ProQuest Information

10/0400059

and Learning Company; All Rights Reserved on STN
ACCESSION NUMBER: 2005:30565 DISSABS Order Number: AAI3151732
TITLE: Characterization of redox-active monolayers for use
in molecular memory devices. Part I: Self-assembled
molecular monolayers on gold. Part II: Covalently
linked molecular monolayers on
semiconductors
AUTHOR: Yasseri, Amir Ali [Ph.D.]; Kuhr, Werner G.
[advisor]; Bocian, David F. [advisor]
CORPORATE SOURCE: University of California, Riverside (0032)
SOURCE: Dissertation Abstracts International, (2004) Vol.
65, No. 10B, p. 5124. Order No.: AAI3151732. 282
pages.
ISBN: 0-496-11938-9.
DOCUMENT TYPE: Dissertation
FILE SEGMENT: DAI
LANGUAGE: English
ENTRY DATE: Entered STN: 20050628
Last Updated on STN: 20050628
ED Entered STN: 20050628
Last Updated on STN: 20050628

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L114 ANSWER 19 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
ACCESSION NUMBER: 2006-299042 [31] WPIX
CROSS REFERENCE: 2003-644858
DOC. NO. CPI: C2006-113238 [36]
DOC. NO. NON-CPI: N2006-291956 [36]
TITLE: Nanoscale electrochemical cell useful in
electrochemical molecular memory device comprises
well having specific cross-sectional area and its
wall having two electrodes separated by
non-conductor or **semi-conductor**
DERWENT CLASS: E12; L03; U11; U14
INVENTOR: BOCIAN D F; KUHR W G; LIU Z;
YASSERI A
PATENT ASSIGNEE: (REGC-C) UNIV CALIFORNIA
COUNTRY COUNT: 1

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| US 20060081950 | A1 | 20060420 | (200631)* | EN | 21[6] | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|-----------|----------------|----------|
| US 20060081950 | A1 Div Ex | US 2001-46499 | 20011026 |
| US 20060081950 | A1 | US 2005-112359 | 20050422 |

PRIORITY APPLN. INFO: US 2005-112359 20050422
US 2001-46499 20011026

ED 20060518

TI Nanoscale electrochemical cell useful in electrochemical molecular
memory device comprises well having specific cross-sectional area
and its wall having two electrodes separated by non-conductor or
semi-conductor

IN BOCIAN D F; KUHR W G; LIU Z; YASSERI A

NOV NOVELTY - A nanoscale electrochemical cell (C1) comprises a well
having a cross-sectional area of less than 1 microns². A wall of
the well comprises a first electrode and a second electrode
separated by a non-conductor or **semi-conductor**
. The first and second electrodes are exposed to the interior of

the well. The ratio of the surface area of the first electrode to the surface area of the second electrode is at least 2:1.

DETD DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

- (1) an electrochemical cell array (A1) comprising several (C1);
- (2) a sensor comprising (A1); and
- (3) formation (M1) of (C1) involves depositing the first conductor on a non-conducting substrate; depositing a **semiconductor** or a nonconductor on the conductor; depositing the second conductor on the **semiconductor** or nonconductor; and forming a hole through the second conductor, the nonconductor or **semiconductor** and the first conductor. The hole forms a well having a cross-sectional area less than 1 microns². The first conductor, insulator or **semiconductor**, and second conductor comprise a wall of the well.

TECH

ELECTRONICS - Preferred Device: The ratio is at least 5:1, and is predetermined. The well has a volume less than 1×10^{-14} L (preferably less than 10 femtoliters (10×10^{-15} L)). The well is in fluid communication with a microchannel. The wells are formed on a **silicon** substrate. The first and second electrode comprises all the walls comprising the well except the bottom wall and if present a top wall. The first electrode is a **semiconductor**. The **semiconductor** is an insulator. The second electrode has electrically coupled to a redox active molecule or a binding partner (preferably binding partner). The redox active molecule is attached to the second electrode via a linker (preferably linker bearing a sulfur or alcohol). The array comprises at least 10 (preferably at least 100) wells. The center to center distance between two wells is less than or equal to 2.5 microns (preferably less than or equal to 250 nm). The several cells comprising (A1) are independently addressable. The array is formed on a **silicon** substrate.

The sensor comprises at least two (at least ten) different binding partners, each species of binding partner in a different well.

Preferred Method: The first and second conductor is deposited by a method selected from electron beam evaporation, thermal evaporation, electrochemical reduction or electroless deposition. The depositing the first and second conductor involves depositing a layer of conducting material and selectively removing regions of the conducting material to form a patterned conducting material. The selective removing involving placing a patterned resist on the conductor and then etching the conductor. The first conductor comprises a silver layer, and the second conductor comprises a chromium gold layer. The nonconductor or **semiconductor** comprises a dielectric. The hole is formed by a method selected from laser drilling, reactive ion etching (RIE), chemically assisted ion beam milling (CAIBM) or etching. (M1) further involving coupling the redox active molecule or the binding partner to the second conductor. The hole is one of several holes.

INORGANIC CHEMISTRY - Preferred component: The insulator and the non-conducting substrate selected from **silicon** dioxide or **silicon** nitride.

ORGANIC CHEMISTRY - Preferred component: The redox-active molecule is a molecule selected from a **porphyrinic** macrocycle, metallocene, linear polyene, cyclic polyene, heteroatom-substituted linear polyene, heteroatom-substituted cyclic polyene, tetrathiafulvalene, tetraselenafulvalene, metal coordination complex, buckyball, triarylamine, 1,4-phenylenediamine, xanthene, flavin, phenazine, phenothiazine, acridine, quinoline, 2,2' - bipyridyl, 4,4'-bipyridyl, tetrathiotetracene or peri-bridged naphthalene dichalcogenide (preferably **porphyrin**, expanded **porphyrin**, contracted **porphyrin**, ferrocene, linear **porphyrin** polymer, **porphyrinic** sandwich complex, **porphyrin** array, **porphyrinic** macrocycle substituted at a beta-position or at a meso-position).

The binding partner is selected from a nucleic acid, protein, antibody, lectin, carbohydrate or glycoprotein. METALLARGY - Preferred component: The first and second electrodes/conductor selected from copper, silver, chromium, gold, platinum, conducting polymer, aluminum, silicon, germanium, gallium arsenide, ruthenium, titanium or tantalum. The first electrode comprises silver electrode, and the second electrode comprises gold electrode.

AN 2006-299042 [31] WPIX

DC E12; L03; U11; U14

IPCI H01L0027-14 [I,A]; H01L0029-66 [I,C]; H01L0029-66 [I,C]; H01L0029-82 [I,A]; H01L0029-84 [I,A]

L114 ANSWER 20 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2006-778377 [79] WPIX

DOC. NO. CPI: C2006-241074 [79]

DOC. NO. NON-CPI: N2006-601317 [79]

TITLE: New **porphyrin** compound, useful for attachment to electroactive surfaces via carbon tethers for use in semiconductor industry

DERWENT CLASS: E13; E23; L03; P31; U11

INVENTOR: LINDSEY J S; LOEWE R S

PATENT ASSIGNEE: (LIND-I) LINDSEY J S; (LOEW-I) LOEWE R S; (UYNC-N) UNIV NORTH CAROLINA STATE

COUNTRY COUNT: 109

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| US 20060009638 | A1 | 20060112 | (200679)* | EN | 23[1] | |
| WO 2006016943 | A1 | 20060216 | (200679) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|-----------------|----------|
| US 20060009638 | A1 | US 2004-886816 | 20040708 |
| WO 2006016943 | A1 | WO 2005-US18858 | 20050527 |

PRIORITY APPLN. INFO: US 2004-886816 20040708

ED 20061208

TI New **porphyrin** compound, useful for attachment to electroactive surfaces via carbon tethers for use in semiconductor industry

TT TT: NEW PORPHYRIN COMPOUND USEFUL ATTACH SURFACE CARBON SEMICONDUCTOR INDUSTRIAL

IN LINDSEY J S; LOEWE R S

NOV NOVELTY - A **porphyrin** compound is new.

DETD DETAILED DESCRIPTION - A **porphyrin** compound is new and has a surface attachment group coupled at the 5 position, the surface attachment group having the formula -((Ar)^m-(CH₂)ⁿ)p-R.

R=-CHCH₂ or -CCH;

Ar=aromatic group;

m=0-4;

n=0-6;

p=greater than or equal to 1.

INDEPENDENT CLAIMS are also included for:

(1) a method of making a **porphyrin** compound having a surface attachment group coupled at the 5 position;

(2) a method of making a dipyrromethane compound having a surface attachment group coupled at the 5 position, comprising reacting a precursor compound of formula X-((Ar)^m-(CH₂)ⁿ)p-R with a pyrrole to produce the dipyrromethane compound having the surface attachment group substituted at the 5 position; and

(3) a method of making a 1,9-diacyldipyrromethane metal

complex, comprising acylating a dipyrrromethane compound having a surface attachment group coupled at the 5 position to form a mixed reaction product comprising a 1,9-diacyldipyrrromethane, combining the mixed reaction product with a compound of formula R'2MX'2 in the presence of a base, and separating the metal complex from the mixed reaction product.

X=aldehyde or acetal group;
R'=alkyl or aryl;
M=Sn, Si, Ge, or Pb;
X'=halo, OAc, acac or Otf.

USE

USE - For attachment to electroactive surfaces via carbon tethers for use in **semiconductor** industry.

TECH

ORGANIC CHEMISTRY - Preparation (claimed): The **porphyrin** compound is prepared by reacting a dipyrrromethane with a dipyrrromethane-1,9-dicarbinol to produce a reaction product, and then oxidizing the reaction product to produce the **porphyrin** compound.

AN 2006-778377 [79] WPIX

DC E13; E23; L03; P31; U11

IC ICM A61B005-055

ICS A61B010-00; A61K031-40; A61K031-555; C07B047-00; C07F005-00

IPCI C07D0403-00 [I,C]; C07D0403-02 [I,A]; C07D0487-00 [I,C];

C07D0487-22 [I,A]

MC CPI: E05-E01B; E05-F; E06-D18; L04-A04D

EPI: U11-A09

CMC UPB 20061208

L114 ANSWER 21 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2006-115499 [12] WPIX

CROSS REFERENCE: 2005-131097; 2005-221542

DOC. NO. CPI: C2006-040936 [12]

DOC. NO. NON-CPI: N2006-099924 [12]

TITLE: Covalently coupling organic molecule, i.e.
redox-active molecule to **surface** of
Group III, IV, or V element, e.g. **silicon**
or to **semiconductor** involves providing
heat resistant organic molecule derivatized with
attachment group

DERWENT CLASS: A26; A85; E19; L03; U11; U12; U14

INVENTOR: BOCIAN D F; LINDSEY J S; LIU

Z; LOEWE R S; YASSERI A A

PATENT ASSIGNEE: (REGC-C) UNIV CALIFORNIA; (UYNC-N) UNIV NORTH
CAROLINA STATE

COUNTRY COUNT: 1

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| US 20050217559 | A1 | 20051006 | (200612)* | EN | 22[5] | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|----------------|-----------------|----------|
| US 20050217559 | A1 Provisional | US 2003-489992P | 20030725 |
| US 20050217559 | A1 Div Ex | US 2003-628868 | 20030728 |
| US 20050217559 | A1 | US 2005-140011 | 20050526 |

PRIORITY APPLN. INFO: US 2005-140011 20050526
US 2003-489992P 20030725
US 2003-628868 20030728

ED 20060217

TI Covalently coupling organic molecule, i.e. redox-active molecule
to **surface** of Group III, IV, or V element, e.g.

silicon or to **semiconductor** involves providing heat resistant organic molecule derivatized with attachment group

TT TT: COVALENT COUPLE ORGANIC MOLECULAR REDOX ACTIVE SURFACE

GROUP IV ELEMENT SILICON

SEMICONDUCTOR HEAT RESISTANCE ATTACH

IN BOCIAN D F; LINDSEY J S; LIU Z; LOEWE R S;
YASSERI A A

NOV NOVELTY - Organic molecule is covalently bonded to a surface of a Group III, IV, or V element or to a semiconductor comprising a Group III, IV, or V element by providing a heat resistant organic molecule derivatized with an attachment group.

DETD DETAILED DESCRIPTION - Covalently coupling an organic molecule to a surface of a Group III, IV, or V element or to a semiconductor comprising a Group III, IV, or V element involves providing a heat resistant organic molecule derivatized with an attachment group; contacting the derivatized heat resistant organic molecule with a surface of the Group III, IV, or V element or semiconductor comprising a Group III, IV, or V element; and heating the surface to greater than or equal to 200degreesC where the attachment group forms a covalent bond with the surface. INDEPENDENT CLAIMS are also included for:

- (a) a redox-active substrate comprising a Group III, IV or V element having attached to a redox-active molecule covalently attached to the surface of the Group III, IV, or V element through an attachment group; and covalent attachment is not by a silane and
- (b) a kit for coupling an organic molecule to the surface of a type III, IV, or V material comprising container containing a heat resistant organic molecule derivatized with an attachment group.

USE USE - For covalently coupling an organic molecule, i.e. redox-active molecule, e.g. **porphyrin**, **porphyrinic** macrocycle, an expanded **porphyrin**, a contracted **porphyrin**, linear **porphyrin** polymer, a **porphyrinic** sandwich coordination complex or **porphyrin** array to a surface of a Group (III)-(V) elements, e.g. silicon, germanium, doped silicon or doped germanium (claimed) or to a semiconductor comprising a Group III-(V) elements.

ADV ADVANTAGE - The method is completed in short times, requires minimal amounts of material, is compatible with diverse molecular functional groups and affords unprecedented attachment motifs, thus enhances the integration of the molecular materials into the processing steps that are needed to create hybrid molecular/semiconductor information storage devices.

TECH ELECTRONICS - Preferred Method: The surface is heated to greater than or equal to 300, preferably greater than or equal to 400degreesC. The method of claim 11, where the surface is hydrogen **passivated** surface. The organic molecule is applied to certain regions of the surface and not to other regions. A protective coating is placed on the surface in regions where the organic molecule is not to be attached.

ORGANIC CHEMISTRY - Preferred Component: The organic molecule comprises a **porphyrinic** macrocycle substituted at beta-position or at a meso-position. It also comprises a **porphyrinic** macrocycle containing at least two **porphyrins** of equal energies held apart from each other at a spacing less than 50Angstrom such that the molecule has an even or an odd hole oxidation where the hole hops between the two **porphyrins**, and where the odd hole oxidation state is different from and distinguishable from another oxidation state of the **porphyrinic** macrocycle. The attachment group is

4-(hydroxymethyl)phenyl, 4-(S-acetylthiomethyl)phenyl,
 4-(Se-acetylselenomethyl)phenyl, 4-(mercaptomethyl)phenyl,
 4-(hydrosele-nomethyl)phenyl, 4-formylphenyl, 4-(bromomethyl)phenyl, 4-vinylphenyl, 4-ethynylphenyl,
 4-allylphenyl, 4-(2-(trimethylsilyl)ethynyl)phenyl,
 4-(2-(triisopropylsilyl)ethynyl) phenyl, 4-bromophenyl,
 4-iodophenyl, 4-hydroxyphenyl, 4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl bromo, iodo, hydroxymethyl,
 S-acetylthiomethyl, Se-acetylselenomethyl, mercaptomethyl,
 hydroselonemethyl, formyl, bromomethyl, chloromethyl, ethynyl,
 vinyl, allyl, 4-(2-(4-hydroxymethyl)phenyl)ethynyl)phenyl,
 4-(ethynyl)biphen-4'-yl, 4-(2-(triisopropylsilyl)ethynyl)biphen-4'-yl, 3,5-diethynylphenyl, or 2-bromoethyl. Organic molecules derivatized with 38 attachment group, e.g. 5-(4-(S-acetylthiomethyl)phenyl)-10,15, 20-trimesitylporphinatozinc(II), 5-(4-(mercaptomethyl)phenyl)- 10,15,20-trimesitylporphinatozinc(II), 5-(4-(hydroxymethyl)phenyl)-10,15,20-trimesitylporphinatozinc(II), 5-(4-(hydroxymethyl)phenyl)10,15,20-tri-p-tolylporphinatozinc(II), 5-(4-allylphenyl)-10,15,20-trimesitylporphinatozinc(II), 5-(4-formylphenyl)-15-phenyl-10,20-di-p-tolylporphinatozinc(II), 5-(4-bromomethylphenyl)-10,15,20-trimesitylporphinatozinc(II), 5-(4-ethynylphenyl)-10,15,20trimesitylporphinatozinc(II), 5-(4-iodophenyl)-10,15,20trimesitylporphinatozinc(II) or 5-(4-bromophenyl)-10,15,20tri-p-tolylporphinatozinc(II).

AN 2006-115499 [12] WPIX
 DC A26; A85; E19; L03; U11; U12; U14
 IC ICM C30B001-00

L114 ANSWER 22 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2005-202415 [21] WPIX
 DOC. NO. CPI: C2005-064704 [21]
 DOC. NO. NON-CPI: N2005-166480 [21]
 TITLE: Patterning of electrolyte on surface of information storage device comprises contacting surface with compound comprising redox active moiety, and subsequently, contacting surface with specific electrolyte
 DERWENT CLASS: A85; E19; L03; T01; U11
 INVENTOR: BOCIAN D F; KUHR W G;
 LINDSEY J S; MISRA V
 PATENT ASSIGNEE: (BOCI-I) BOCIAN D F; (KUHR-I) KUHR W G; (LIND-I) LINDSEY J S; (MISR-I) MISRA V; (REGC-C) UNIV CALIFORNIA; (UYNC-N) UNIV NORTH CAROLINA STATE
 COUNTRY COUNT: 106

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|--------|----------|
| <hr/> | | | | | | |
| WO 2005017953 | A2 | 20050224 | (200521)* | EN | 71[13] | |
| US 20050207208 | A1 | 20050922 | (200563) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-------------------|-------------|-----------------|----------|
| <hr/> | | | |
| WO 2005017953 A2 | | WO 2004-US15615 | 20040518 |
| US 20050207208 A1 | Provisional | US 2003-473782P | 20030527 |
| US 20050207208 A1 | | US 2004-837028 | 20040430 |

PRIORITY APPLN. INFO: US 2003-473782P 20030527
 US 2004-837028 20040430

ED 20050708
 IN BOCIAN D F; KUHR W G; LINDSEY J S;
 MISRA V
 TECH

ORGANIC CHEMISTRY - Preferred Property: The surface attachment group reacts on contacting with the surface, is heat activated, photo activated or activated by electromagnetic radiation.

Preferred Process: The charged moiety is contacted with a reagent of formula: Z2-L3-KY.

K = group having charge complementary to the charge of J;

L3 = covalent bond or linker;

Z2 = surface attachment group, preferably (un) protected reactive site or group chosen from carboxylic acid, alcohol, thiol, selenol, tellurol, phosphonic acid, phosphonothioate, amine and nitrile;

-L3-Z2 = group chosen from 32 phenyl groups such as

4-carboxyphenyl, 2(4-carboxyphenyl) ethynyl, 4-(2-(4-carboxyphenyl)ethynyl)phenyl and 4-hydroxy(mercapto)phosphoryl phenyl; and

Y = counter ion.

K electrostatically associates with J to provide a counter ion group associated with information storage molecule. The counter ion is altered by an ion exchange process. A counter electrode is constructed by binding an electrode comprising conductive material or semiconductive material to the surface attachment group.

Preferred Reagent: The reagent is 11-mercaptop undecanoic acid, 16-mercaptop hexadecanoic acid, 3-mercaptop-1-propanoic acid, (2-mercaptop ethyl)trimethyl ammonium bromide or 4-(mercaptop methyl)benzene sulfonic acid.

Preferred Substrate: Alternately, the electro active substrate contains zone (A) having surface with an attached redox-active moiety of formula: J-L2-M-L1-Z1-S or Z2-L3-K---J-L2-M-L1-Z1-S.

J,L1-L 3,M,Z1,Z2,S,K = same as defined above.

The electro active substrate contains zone (B) having surface with an attached redox-active moiety different than M.

ELECTRONICS - Preferred Process: The method of storing data further involves detecting the oxidation state of the storage medium (102), refreshing the oxidation state of the medium, and reading out the data stored. The detecting process involves analyzing a read out signal in the time domain or frequency domain, or performing Fourier transform on the read out signal. The process further involves exposing the medium to an electric field to produce electric field oscillation having characteristic frequency and detecting the frequency. The detecting is performed by volumetric method or impedance spectroscopy. The voltage applied for storing data is up to 2V, or output of integrated circuit or logic gate.

ABEX DEFINITIONS - Preferred Definitions: - M = exists in 8 different oxidation states, porphyrinic macrocycle, porphyrin, sandwich coordination compound of porphyrinic macrocycle, metallocene, linear or cyclic polyene optionally substituted with hetero atom, tetra thia fulvalene, tetraselena fulvalene, metal coordinated complex, triaryl amine, 1,4-phenylene diamine, xanthene, flavin, phenazine, pheno thiazine, acridine, quinoline, 2,2'-bipyridyl, 4,4'-bipyridyl, tetrathio tetracene or peri-bridged naphthalene dichalcogenide; - Q = acyl hydrazide, amine, dipyrrin, acetylacetone, phenol, alcohol, diol, thiol, azide, phenanthrolene, zirconium dichloride, alkyl halide, aldehyde or zirconium hydroxide; - Z1, Z2 = optionally protected carboxylic acid, alcohol, thiol, selenol, tellurol, phosphonic acid, phosphonothioate, amine or nitrile; - L1, L2 = covalent bond, linker, 1,4-phenylene, 4,4'-diphenyl ethylene, 4,4'-diphenyl butadiyne, 4,4'-biphenyl, 4,4'-stilbene, 1,4-bicyclo octane, 4,4'-azobenzene, 4,4'-benzylidene aniline or 4,4''-terphenyl; - R = carboxaldehyde, ketone (e.g. acetylacetone), o-hydroxy carboxaldehyde, dipyrrin or amine; and - When R is carboxaldehyde, o-hydroxy carboxaldehyde or ketone, Q is acyl hydrazide or amine. When R is dipyrrin, Q is also dipyrrin.

EXAMPLE - Free base dipyrrin bearing benzyl alcohol unit was reacted at high concentration and high temperature to attach on

semiconductor surface. Copper acetate and triple decker sandwich coordination compound containing free base dipyrrin were added to obtain bis(dipyrrinato)copper II complex. Reagent containing phenol and acid hydrazide was added and phenol was reacted with phenol isocyanate compound having protected phosphonate unit. The phosphonate was deprotected and a counter electrode was deposited. The excess incoming reactants and reagents were washed. The copper II complex was resilient and did not undergo decomposition.

AN 2005-202415 [21] WPIX
DC A85; E19; L03; T01; U11

L114 ANSWER 23 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN
 ACCESSION NUMBER: 2003-332855 [31] WPIX
 CROSS REFERENCE: 2002-315248; 2002-361749; 2003-512072;
 2003-863373; 2004-592616
 DOC. NO. CPI: C2003-086279 [31]
 DOC. NO. NON-CPI: N2003-266808 [31]
 TITLE: Light harvesting rod composition for light harvesting array for solar cell used in electrical devices, includes oligomer
 DERWENT CLASS: E12; E13; L03; U12
 INVENTOR: LINDSEY J S; LOEWE R S
 PATENT ASSIGNEE: (UYNC-N) UNIV NORTH CAROLINA STATE; (LIND-I)
 LINDSEY J S; (LOEW-I) LOEWE R S
 COUNTRY COUNT: 99

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-----|----------|
| WO 2003019621 | A2 | 20030306 | (200331)* | EN | 105 | [3] |
| US 20030111108 | A1 | 20030619 | (200341) | EN | | |
| US 6603070 | B2 | 20030805 | (200353) | EN | | |
| AU 2002327519 | A1 | 20030310 | (200452) | EN | | |
| AU 2002327519 | A8 | 20051110 | (200634) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|-------------------|--------|-----------------|----------|
| WO 2003019621 A2 | | WO 2002-US26948 | 20020823 |
| US 20030111108 A1 | CIP of | US 2000-621797 | 20000721 |
| US 6603070 B2 | CIP of | US 2000-621797 | 20000721 |
| US 20030111108 A1 | CIP of | US 2000-670463 | 20000926 |
| US 6603070 B2 | CIP of | US 2000-670463 | 20000926 |
| US 20030111108 A1 | CIP of | US 2001-852560 | 20010510 |
| US 6603070 B2 | CIP of | US 2001-852560 | 20010510 |
| US 20030111108 A1 | | US 2001-939010 | 20010824 |
| US 6603070 B2 | | US 2001-939010 | 20010824 |
| AU 2002327519 A1 | | AU 2002-327519 | 20020823 |
| AU 2002327519 A8 | | AU 2002-327519 | 20020823 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO | | |
|----------------|------|-----------|---------------|---|
| US 20030111108 | A1 | CIP of | US 6420648 | B |
| US 6603070 | B2 | CIP of | US 6420648 | B |
| AU 2002327519 | A1 | Based on | WO 2003019621 | A |
| AU 2002327519 | A8 | Based on | WO 2003019621 | A |

PRIORITY APPLN. INFO: US 2001-939010 20010824
 US 2000-621797 20000721
 US 2000-670463 20000926
 US 2001-852560 20010510

ED 20050528

IN LINDSEY J S; LOEWE R S

DETD DETAILED DESCRIPTION - A light harvesting rod composition comprises an oligomer of formula $A_1(A_{b+1})^b$ (I).

INDEPENDENT CLAIMS are included for:

(1) a light harvesting array comprising a first substrate containing a first electrode, and a layer of light harvesting rods electrically coupled to the first electrode;

(2) a solar cell comprising the inventive light harvesting array, a second substrate comprising a second electrode, and an electrolyte in the space between the substrates; an electrical device comprising the solar cell, and a circuit electrically coupled to the solar cell;

(3) a method of making a light harvesting rod composition comprising coupling rod segments of formulae $E(X_1(X_{m+1})^m)^1F$ and $G(X_1(X_{m+1})^m)^2H$. $b = \text{at least } 1;$ A_1 through A_{b+1} = covalently coupled rod different segments having less positive electrochemical potentials; or a compound of formula $X_1(X_{m+1})^m$; $m = \text{at least } 1;$ X_1 through X_{m+1} = covalently coupled porphyrinic macrocycles; $E = \text{end group};$ Either F or $G = \text{ethynyl group; and}$ the other F or G is halo; $H = \text{end group}.$

ADV ADVANTAGE - The invention has intense absorption in the visible region, a narrow distribution of energies of the excited state, and an excited single-state lifetime sufficient for energy transfer. It does not require high temperature annealing steps to reduce internal resistances and does not have any losses associated with transporting charge through thick semiconductor films.

ABEX DEFINITIONS - Preferred Definitions: - X_1 through X_{m+1} = chlorins, bacteriochlorins, or isobacteriochlorins; - $b = 1-5$, preferably 1-2; - $m = 20$, preferably 1-5; - X_1 through X_{m+1} = beta-linked porphyrinic macrocycles; - $F = \text{trimethylsilyl-protected ethynylphenyl; }$ - $G = \text{halo or iodo; }$ - $E = \text{bromo or protected ethynyl.}$

EXAMPLE - A solution of porphyrin (506 mg) in trichloromethane (140 ml) was treated with zinc acetate (613 mg) overnight at room temperature. Standard workup and sonication with methanol afforded a purple solid (515 mg, 95%).

AN 2003-332855 [31] WPIX

DC E12; E13; L03; U12

L114 ANSWER 24 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2003-644858 [61] WPIX

CROSS REFERENCE: 2006-299042

DOC. NO. CPI: C2003-176239 [61]

DOC. NO. NON-CPI: N2003-512973 [61]

TITLE: Electrochemical cell array used for, e.g. molecular memory, includes nanoscale electrochemical cells including first and second electrodes separated by non-conductor or semi-conductor

DERWENT CLASS: L03; U14; X16

INVENTOR: BOCIAN D F; KUHR W G; LIU Z;

YASSERI A

PATENT ASSIGNEE: (REGC-C) UNIV CALIFORNIA

COUNTRY COUNT: 100

PATENT INFO ABBR.:

| PATENT NO | KIND DATE | WEEK | LA | PG | MAIN IPC |
|-----------|-----------|------|----|----|----------|
|-----------|-----------|------|----|----|----------|

| | | | | | |
|----------------|----|----------|-----------|----|-------|
| US 20030082444 | A1 | 20030501 | (200361)* | EN | 25[6] |
| WO 2003085752 | A2 | 20031016 | (200378) | EN | |
| AU 2002367718 | A1 | 20031020 | (200436) | EN | |
| EP 1449218 | A2 | 20040825 | (200456) | EN | |
| JP 2005520348 | W | 20050707 | (200545) | JA | 40 |
| AU 2002367718 | A8 | 20051020 | (200615) | EN | |
| US 7074519 | B2 | 20060711 | (200646) | EN | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|-----------------|----------|
| US 20030082444 | A1 | US 2001-46499 | 20011026 |
| AU 2002367718 | A1 | AU 2002-367718 | 20021007 |
| AU 2002367718 | A8 | AU 2002-367718 | 20021007 |
| EP 1449218 | A2 | EP 2002-807197 | 20021007 |
| WO 2003085752 | A2 | WO 2002-US32035 | 20021007 |
| EP 1449218 | A2 | WO 2002-US32035 | 20021007 |
| JP 2005520348 | W | WO 2002-US32035 | 20021007 |
| JP 2005520348 | W | JP 2003-582835 | 20021007 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO | |
|---------------|------|-----------|-----------------|
| AU 2002367718 | A1 | Based on | WO 2003085752 A |
| EP 1449218 | A2 | Based on | WO 2003085752 A |
| JP 2005520348 | W | Based on | WO 2003085752 A |
| AU 2002367718 | A8 | Based on | WO 2003085752 A |

PRIORITY APPLN. INFO: US 2001-46499 20011026

ED 20050531

TI Electrochemical cell array used for, e.g. molecular memory, includes nanoscale electrochemical cells including first and second electrodes separated by non-conductor or **semi-conductor**

IN BOCIAN D F; KUHR W G; LIU Z; YASSERI A

NOV NOVELTY - An electrochemical cell array comprises nanoscale electrochemical cells, where a cell comprising the array is a well having a cross-sectional area of less than 1 micron. A wall of the well comprises a first electrode (14) and a second electrode (16). The first and second electrodes are separated by a non-conductor or **semiconductor**.DETD DETAILED DESCRIPTION - An electrochemical cell array comprises nanoscale electrochemical cells, where a cell comprising the array is a well having a cross-sectional area of less than 1 micron. A wall of the well comprises a first electrode and a second electrode. The first and second electrodes are separated by a non-conductor or **semi-conductor**. The ratio of the surface area of the first electrode exposed to the interior of the well to the surface area of the second electrode exposed to the interior of the well is at least 2:1.

An INDEPENDENT CLAIM is also included for a method of making a nanoscale electrochemical cell comprising:

- (i) depositing a first conductor on a non-conducting substrate;
- (ii) depositing a **semiconductor** or a non-conductor;
- (iii) depositing a second conductor; and
- (iv) forming a hole through the second conductor, the non-conductor, and the first conductor, where the hole forms a well having a cross-sectional area of less than 1 **um**.

TECH

ELECTRICAL POWER AND ENERGY - Preferred Component: The array comprises at least 10 wells, preferably at least 100 wells. The first electrode comprises all the walls comprising the well. The first electrode is a **semiconductor** which is an insulator. The second electrode is electrically coupled to a redox

10/0400059

active molecule via a linker bearing a sulfur or alcohol.

Preferred Concentration: The ratio is at least 5:1.

Preferred Property: The well has a volume of less than 1 x10power-14 L.

Preferred Dimension: The center to center distance between two wells comprising the array is at most 2.5 mum, preferably at most 250 nm.

INORGANIC CHEMISTRY - Preferred Material: The first electrode comprises copper, silver, chromium, gold, platinum, aluminum, silicon, germanium, gallium arsenide, ruthenium, titanium, or tantalum. The insulator comprises silicon dioxide, or silicon nitride.

POLYMERS - Preferred Material: The first electrode may comprise a conducting polymer.

Preferred Component: The redox-active molecule comprises porphyrin macrocycle, a metallocene, a linear polyene, cyclic polyene, heteroatom-substituted linear polyene, heteroatom-substituted cyclic polyene, tetrathiafulvalene, tetraselenafulvalene, metal coordination complex, buckball, triarylamine, 1,4-phenylenediamine, xanthene, flavin, phenazine, phenothiazine, acridine, quinoline, 2,2'-bipyridyl, 4,4'-bipyridyl, tetrathiotetracene, or peri-bridged naphthalene dichalcogenide. It may comprise porphyrin, expanded porphyrin, contracted porphyrin, ferrocene, linear porphyrin polymer, porphyrin sandwich complex, or porphyrin array. The organic molecule comprises a porphyrin macrocycle substituted at a beta-position or at a meso-position.

ORGANIC CHEMISTRY - Preferred Component: The binding partner comprises nucleic acid, protein, antibody, lectin, carbohydrate, or glycoprotein.

AN 2003-644858 [61] WPIX

L114 ANSWER 25 OF 31 WPIX COPYRIGHT 2007 THE THOMSON CORP on STN

ACCESSION NUMBER: 2003-567427 [53] WPIX

DOC. NO. NON-CPI: N2003-451115 [53]

TITLE: Organic molecule coupling method for semiconductor fabrication, involves halogenating group four elements surface by solution contacting surface under condition when solvent is rapidly removed

DERWENT CLASS: U11; U14

INVENTOR: BOCIAN D F; DABKE R B;
KUHR W G; LINDSEY J S; LIU Z

PATENT ASSIGNEE: (REGC-C) UNIV CALIFORNIA

COUNTRY COUNT: 99

PATENT INFO ABBR.:

| PATENT NO | KIND | DATE | WEEK | LA | PG | MAIN IPC |
|----------------|------|----------|-----------|----|-------|----------|
| US 20030081463 | A1 | 20030501 | (200353)* | EN | 27[5] | |
| WO 2003038886 | A1 | 20030508 | (200353) | EN | | |
| AU 2002351504 | A1 | 20030512 | (200464) | EN | | |

APPLICATION DETAILS:

| PATENT NO | KIND | APPLICATION | DATE |
|----------------|------|-----------------|----------|
| US 20030081463 | A1 | US 2001-40059 | 20011026 |
| AU 2002351504 | A1 | AU 2002-351504 | 20021014 |
| WO 2003038886 | A1 | WO 2002-US33045 | 20021014 |

FILING DETAILS:

| PATENT NO | KIND | PATENT NO |
|-----------|------|-----------|
|-----------|------|-----------|

AU 2002351504 A1 Based on WO 2003038886 A

PRIORITY APPLN. INFO: US 2001-40059 20011026
ED 20050531
TI Organic molecule coupling method for **semiconductor**
fabrication, involves halogenating group four elements surface by
solution contacting surface under condition when solvent is
rapidly removed
TT TT: ORGANIC MOLECULAR COUPLE METHOD **SEMICONDUCTOR**
FABRICATE HALOGENATED GROUP FOUR ELEMENT SURFACE SOLUTION
CONTACT CONDITION SOLVENT RAPID REMOVE
IN BOCIAN D F; DABKE R B; KUHR W G;
LINDSEY J S; LIU Z
USE
USE - Used in **semiconductor** fabrication to couple
organic molecules with the group four elements e.g.
silicon and germanium.
AN 2003-567427 [53] WPIX
DC U11; U14
IC ICM G11C007-00; H01L021-3205
ICS H01L021-4763
MC EPI: U11-C01J5; U14-A03X

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(FILE 'HOME' ENTERED AT 15:02:09 ON 22 JAN 2007)

FILE 'HCAPLUS' ENTERED AT 15:06:14 ON 22 JAN 2007
L1 1 SEA ABB=ON PLU=ON US2001-040059/APPS
D ALL

FILE 'ZCAPLUS' ENTERED AT 15:07:44 ON 22 JAN 2007
L2 QUE ABB=ON PLU=ON BOCIAN D?/AU
L3 QUE ABB=ON PLU=ON KUHR W?/AU
L4 QUE ABB=ON PLU=ON LINDSEY J?/AU
L5 QUE ABB=ON PLU=ON DABKE R?/AU
L6 QUE ABB=ON PLU=ON LIU Z?/AU
L7 QUE ABB=ON PLU=ON LIU ZHIMING?/AU
L8 QUE ABB=ON PLU=ON (L2 OR L3 OR L4 OR L5) OR L7
L9 QUE ABB=ON PLU=ON L2 AND L3 AND L4 AND L5 AND L6

FILE 'HCAPLUS' ENTERED AT 15:11:11 ON 22 JAN 2007
L10 4 SEA ABB=ON PLU=ON L2 AND L3 AND L4 AND L5 AND L6
D SCAN
L11 968 SEA ABB=ON PLU=ON (L2 OR L3 OR L4 OR L5) OR L7

FILE 'NTIS, COMPENDEX, INSPEC, SOLIDSTATE, CERAB, CONFSCI,
DISSABS, WPIX' ENTERED AT 15:16:40 ON 22 JAN 2007
L12 689 SEA ABB=ON PLU=ON L8
L13 39 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
AND L12
D 1-39 TI
L14 19 SEA ABB=ON PLU=ON L13 AND PORPHYRIN?
L15 21 SEA ABB=ON PLU=ON L13 AND (SILICON? OR GROUP(W) (IV
OR 4))
L16 13 SEA ABB=ON PLU=ON L14 AND L15
D 1-13 TI
L17 27 SEA ABB=ON PLU=ON L14 OR L15
D L17 1-17 TI
D QUE
L18 667 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
AND PORPHYRIN?

10/0400059

L19 438489 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
AND (SILICON? OR GROUP(W) (IV OR 4))
L20 81 SEA ABB=ON PLU=ON L18 AND L19
L21 16 SEA ABB=ON PLU=ON L20 AND (MONOLAYER? OR MONO(W)
LAYER? OR SELF(N) ASSEMBL?)
D 1-16
L22 61 SEA ABB=ON PLU=ON L20 AND (SUBSTRAT? OR SURFACE? OR
BASE# OR SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR
FOUNDATION? OR PANE? OR DISK? OR DISC# OR WAFER? OR
PLATE OR PLATES)
L23 3 SEA ABB=ON PLU=ON L22 AND PASSIVAT?
D 1-3
D 1-3 KWIC
L24 5139 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
AND (?PORPHYRIN? OR ?PORPHIN? OR CHLORIN OR HEMIN? OR
?PHTHALOCYAN?)
L25 581 SEA ABB=ON PLU=ON L24 AND L19
D QUE L22
L26 455 SEA ABB=ON PLU=ON L25 AND (SUBSTRAT? OR SURFACE? OR
BASE# OR SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR
FOUNDATION? OR PANE? OR DISK? OR DISC# OR WAFER? OR
PLATE OR PLATES)
L27 56 SEA ABB=ON PLU=ON L26 AND (MONOLAYER? OR MONO(W)
LAYER? OR SELF(N) ASSEMBL?)
L28 54 SEA ABB=ON PLU=ON L26 AND (HALOGENAT? OR IODIN? OR
BROMIN? OR CHLORIN? OR FLUORIN?)
D 1-5 KWIC
L29 3 SEA ABB=ON PLU=ON L26 AND (DOPE# OR DOPING? OR
DOPANT?) (6N) ((N OR P) (3N) TYPE)
D 1-3 KWIC
L30 62 SEA ABB=ON PLU=ON L26 AND (DOPE# OR DOPING? OR
DOPANT?)
L31 53 SEA ABB=ON PLU=ON L26 AND ((N OR P) (3N) TYPE)
L32 14 SEA ABB=ON PLU=ON L30 AND L31
D 1-14 KWIC
L33 188 SEA ABB=ON PLU=ON (L27 OR L28 OR L29 OR L30 OR L31
OR L32)
L34 189 SEA ABB=ON PLU=ON L33 OR L21 OR L23
L35 49 SEA ABB=ON PLU=ON L34 AND (ALCOHOL? OR OH OR
HYDROXY?)
D 1-5 KWIC
L36 2 SEA ABB=ON PLU=ON L35 AND (((SILICON OR SI) (N) (OXYGEN
OR O)) (3N) BOND?)
D 1-2 KWIC
L37 3 SEA ABB=ON PLU=ON L26 AND (((SILICON OR SI). (N) (OXYGEN
OR O)) (3N) BOND?)
D 1-3 KWIC
L38 3 SEA ABB=ON PLU=ON L25 AND (((SILICON OR SI) (N) (OXYGEN
OR O)) (3N) BOND?)
L39 9 SEA ABB=ON PLU=ON L23 OR L29 OR (L36 OR L37)
D 1-9 KWIC
L40 56 SEA ABB=ON PLU=ON L27 AND ((L28 OR L29 OR L30 OR L31
OR L32 OR L33 OR L34 OR L35 OR L36 OR L37 OR L38 OR
L39))
D QUE
L41 55 SEA ABB=ON PLU=ON L40 NOT L39
L42 22 SEA ABB=ON PLU=ON L27 AND (L28 OR L30 OR L31 OR L35)

D 1-22
L43 14 SEA ABB=ON PLU=ON L28 AND (L30 OR L31)
L44 16 SEA ABB=ON PLU=ON L28 AND L35
L45 35 SEA ABB=ON PLU=ON L39 OR L43 OR L44
L46 52 SEA ABB=ON PLU=ON L45 OR L42
L47 7 SEA ABB=ON PLU=ON L46 AND L12
L48 45 SEA ABB=ON PLU=ON L46 NOT L47
L49 20 SEA ABB=ON PLU=ON L17 NOT L47
D L47 1-7 KWIC

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D L17 1-27 TI

FILE 'HCAPLUS' ENTERED AT 16:15:34 ON 22 JAN 2007
D SCAN L10

L50 171851 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
AND (SILICON? OR GROUP(W) (IV OR 4))

FILE 'ZCAPLUS' ENTERED AT 16:17:57 ON 22 JAN 2007

FILE 'REGISTRY' ENTERED AT 16:19:07 ON 22 JAN 2007
E SILICON/CN

L51 1 SEA ABB=ON PLU=ON SILICON/CN
D SCAN
L52 1 SEA ABB=ON PLU=ON PORPHYRIN/CN
L53 1 SEA ABB=ON PLU=ON PHTHALOCYANINE/CN
L54 1 SEA ABB=ON PLU=ON CHLORIN/CN
L55 1 SEA ABB=ON PLU=ON HEMIN/CN

FILE 'HCAPLUS' ENTERED AT 16:22:08 ON 22 JAN 2007

L56 QUE ABB=ON PLU=ON L51 OR SILICON OR SI
L57 632 SEA ABB=ON PLU=ON L52/D OR L52/DP
L58 2851 SEA ABB=ON PLU=ON L53/D OR L53/DP
L59 119 SEA ABB=ON PLU=ON L54/D OR L54/DP
L60 220 SEA ABB=ON PLU=ON L55/D OR L55/DP
E PORPHYRIN/CT
L61 82774 SEA ABB=ON PLU=ON PORPHYRINS+PFT, OLD, NT/CT
L62 8102 SEA ABB=ON PLU=ON PHTHALOCYANINE+PFT, OLD, NT/CT
L63 82774 SEA ABB=ON PLU=ON L61 OR L62
E SILICON+PFT, OLD, NT/CT
E SILICON/CT
L64 458816 SEA ABB=ON PLU=ON SILICON+PFT, OLD, NT/CT
L65 QUE ABB=ON PLU=ON ?PORPHYRIN? OR ?PORPHIN? OR
CHLORIN OR HEMIN? OR ?PHTHALOCYAN?

FILE 'ZCAPLUS' ENTERED AT 16:33:05 ON 22 JAN 2007

L66 QUE ABB=ON PLU=ON (DOPE# OR DOPING? OR DOPANT?) (L) ((N
OR P) (L) TYPE)
L67 QUE ABB=ON PLU=ON PASSIVATION+PFT, OLD, NT/CT
L68 QUE ABB=ON PLU=ON "SURFACE TREATMENT"+PFT, OLD, NT/CT
L69 QUE ABB=ON PLU=ON "SELF-ASSEMBLED MONOLAYERS"+PFT, OLD
, NT/CT
L70 QUE ABB=ON PLU=ON SUBSTRAT? OR SURFACE? OR BASE# OR
SUBSTRUCT? OR UNDERSTRUCTUR? OR UNDERLAY? OR FOUNDATION
? OR PANE? OR DISK? OR DISC# OR WAFER? OR PLATE OR
PLATES
L71 QUE ABB=ON PLU=ON OXYGEN OR O
D QUE L28
L72 QUE ABB=ON PLU=ON (HALOGENAT? OR IODIN? OR BROMIN?
OR CHLORIN? OR FLUORIN?)
L73 QUE ABB=ON PLU=ON (HYDROGEN OR H) (L) (PASSIVAT? OR
L67)
D QUE L***
L74 QUE ABB=ON PLU=ON L56 OR L64

FILE 'HCAPLUS' ENTERED AT 16:44:17 ON 22 JAN 2007

L75 5118 SEA ABB=ON PLU=ON L50 AND L74 AND ((L57 OR L58 OR
L59 OR L60) OR L66 OR L63)
D QUE
L76 3618 SEA ABB=ON PLU=ON L75 AND L70
D QUE L74
L77 421250 SEA ABB=ON PLU=ON L74 (L) L70
L78 2919 SEA ABB=ON PLU=ON L76 AND L77
D QUE
L79 2882 SEA ABB=ON PLU=ON L78 AND L66
L80 QUE ABB=ON PLU=ON (L56(A) L71) (3A) BOND?
L81 2 SEA ABB=ON PLU=ON L79 AND L80
D 1-2 KWIC

D QUE
 D QUE L75
 L82 94 SEA ABB=ON PLU=ON L50 AND L74 AND ((L57 OR L58 OR
 L59 OR L60) OR L63)
 D QUE
 L83 59 SEA ABB=ON PLU=ON L82 AND L70
 L84 1 SEA ABB=ON PLU=ON L83 AND L66
 D KWIC
 L85 38 SEA ABB=ON PLU=ON L82 AND L77
 D 1-5 KWIC
 L86 1 SEA ABB=ON PLU=ON L85 AND L66
 D KWIC
 L87 0 SEA ABB=ON PLU=ON L85 AND L80
 L88 2 SEA ABB=ON PLU=ON L76 AND L80
 D 1-2 KWIC
 L89 QUE ABB=ON PLU=ON (L56(A)L71) (L) BOND?
 L90 2 SEA ABB=ON PLU=ON L78 AND L89
 D 1-2 KWIC
 D QUE
 L91 0 SEA ABB=ON PLU=ON L90 AND ((L57 OR L58 OR L59 OR
 L60) OR L63)
 D QUE
 D 1-9 KWIC
 L92 6269 SEA ABB=ON PLU=ON (L56(A)L71) (3A) BOND?
 D 1-9 KWIC
 L93 QUE ABB=ON PLU=ON (L56(A)L71) (2A) BOND?
 L94 5889 SEA ABB=ON PLU=ON (L56(A)L71) (2A) BOND?
 D QUE L82
 L95 186319 SEA ABB=ON PLU=ON (SEMICONDUCT? OR SEMI(W) CONDUCT?)
 AND L74
 L96 350 SEA ABB=ON PLU=ON L95 AND ((L57 OR L58 OR L59 OR L60
 OR L61 OR L62 OR L63) OR L65)
 D QUE
 L97 2 SEA ABB=ON PLU=ON L96 AND L80
 D 1-2 KWIC
 D QUE L96
 L98 252 SEA ABB=ON PLU=ON L96 AND L70
 L99 187 SEA ABB=ON PLU=ON L96 AND L77
 L100 5 SEA ABB=ON PLU=ON L99 AND L66
 D 1-5 KWIC
 L101 5 SEA ABB=ON PLU=ON L98 AND L66
 L102 10 SEA ABB=ON PLU=ON L99 AND L72
 D 1-10 KWIC
 L103 4 SEA ABB=ON PLU=ON L99 AND L73
 D SCAN
 L104 2 SEA ABB=ON PLU=ON L96 AND L93
 D 1-2 KWIC
 D QUE L27
 L105 QUE ABB=ON PLU=ON MONOLAYER? OR MONO(W) LAYER? OR
 SELF(A) ASSEMBL? OR L69
 L106 20 SEA ABB=ON PLU=ON L81 OR L84 OR L88 OR L90 OR L97 OR
 (L100 OR L101 OR L102 OR L103 OR L104)
 D SCAN
 L107 12 SEA ABB=ON PLU=ON L99 AND (COAT? OR FILM?) AND (BASE
 OR BASIC)
 D 1-12 KWIC
 L108 31 SEA ABB=ON PLU=ON L106 OR L107
 L109 3 SEA ABB=ON PLU=ON L8 AND L108
 D 1-3 KWIC
 L110 28 SEA ABB=ON PLU=ON L108 NOT L109
 L111 11 SEA ABB=ON PLU=ON L8 AND L96
 D 1-11 KWIC
 L112 13 SEA ABB=ON PLU=ON L109 OR L111 OR L10

FILE 'STNGUIDE' ENTERED AT 17:31:39 ON 22 JAN 2007
 D QUE L110
 D QUE L48

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FILE 'HCAPLUS, COMPENDEX, INSPEC, DISSABS, WPIX' ENTERED AT
17:32:45 ON 22 JAN 2007

L113 72 DUP REM L110 L48 (1 DUPLICATE REMOVED)
ANSWERS '1-28' FROM FILE HCAPLUS
ANSWER '29' FROM FILE COMPENDEX
ANSWERS '30-33' FROM FILE INSPEC
ANSWER '34' FROM FILE DISSABS
ANSWERS '35-72' FROM FILE WPIX
D L113 1-28 IBIB ABS ED HITSTR HITIND
D L113 29-34 IBIB ED AB IND
D L113 35-72 IALL ABEQ TECH ABEX
D QUE L112
D QUE L47
D QUE L49

FILE 'HCAPLUS, COMPENDEX, SOLIDSTATE, WPIX, INSPEC, DISSABS'
ENTERED AT 17:42:51 ON 22 JAN 2007

L114 31 DUP REM L112 L47 L49 (9 DUPLICATES REMOVED)
ANSWERS '1-13' FROM FILE HCAPLUS
ANSWERS '14-17' FROM FILE COMPENDEX
ANSWER '18' FROM FILE SOLIDSTATE
ANSWERS '19-25' FROM FILE WPIX
ANSWERS '26-29' FROM FILE INSPEC
ANSWERS '30-31' FROM FILE DISSABS
D L114 1-13 IBIB ABS ED HITSTR HITIND
D L114 14-17,26-31 IBIB ED
D L114 19-25 IBIB ED HIT IND